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I.

THE RESISTANCE OF TISSUES AS A FACTOR IN THE MANUAL REDUCTION OF CONGENITAL HIP DISLOCATION.

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It is now universally admitted that the chief obstacle in the reduction of a congenitally dislocated hip lies in the soft parts rather than the bone, and it is manifestly of practical interest to determine which tissues offer the greatest resistance.

It has been a matter of discussion whether the greatest difficulty is encountered in overcoming the altered capsule or from certain shortened muscles. Reasoning from analogy, from normal anatomy, and the strength of the capsule and ligaments of the hip, many writers, myself among them, have believed that these rather than the muscles were of the greatest importance in maintaining the dislocated position in a congenitally dislocated hip, as the capsule and ligaments offer the chief obstacle to a dislocation in a normal hip.

The writer has been led to give up the opinion that in the capsular resistance the chief obstacle to reduction is to be found, by his recent experience in operating by incision in certain resistant cases, from which it has been clear that, even after all capsular contraction has been removed and the capsule entirely freed from any connection with the neck of the femur, the lesser trochanter, or the shaft within half an inch below

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the lesser trochanter, a formidable obstacle often remains to elongating the limb to its normal length or to placing the head of the femur sufficiently below the acetabulum. If this obstacle does not lie in the capsule, it must be found in the muscles; and, if in the muscles, it appears to be beyond the limit of skill by manual manipulative reduction where failure or disaster have followed manual reduction. Following this line of reasoning, the question presents itself as to the practicability of using a more thorough division of the muscles as an aid to reduction than has hitherto been employed.

Tenotomy and myotomy have been tried in the reduction of congenital dislocation of the hip by a few surgeons; but the method has not received general acceptance, perhaps because the attention of the surgical world has been turned to other methods, and perhaps also to a degree because the precise usefulness of the method has not been carefully studied. Tenotomy alone will not cure club foot. It is only within a century that its general use was advocated. At one time, however, tenotomy was regarded as the only important factor in the correction of club foot by surgeons, and relapse was the usual result. It is certainly true that myotomy and tenotomy of the muscles around the hip in congenital dislocation are of no benefit unless used in connection with careful manipulation. Now, however, that the manipulative method has been carefully studied and is of approved efficiency, may we not also take advantage of tenotomy as an aid? The objections which have been urged against the use of the knife in congenital correction of deformity are the danger of sepsis, that extensive excision would be needed which would lead to cicatrization and also that it is an unnecessary procedure. Are these objections valid? The subject is one in which anatomical investigation can be made with advantage.

Through the courtesy of Professor Dwight the anatomical opportunities of the Harvard Medical School were placed at my disposal, and an adult dissecting-room cadaver was examined by Professor Dwight and myself to discover the possibility, with moderate force, of lengthening the limb by traction.

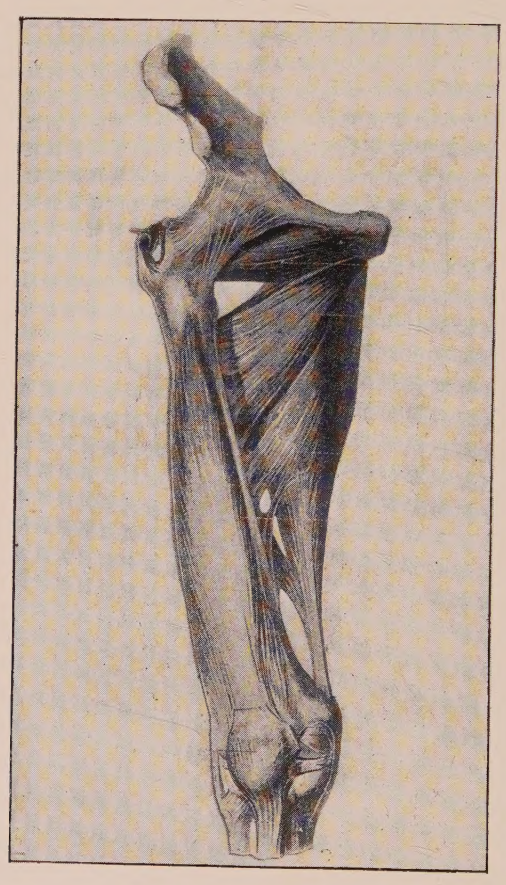
It was found that where the capsule of the hip joint was freely incised a slight amount of lengthening of the limb could be gained by traction. When the long adductor and hamstring muscles were divided and the fascia lata cut, the limb could easily be lengthened two inches more.

The largest group of the muscles to be considered is the adductors. The glutei have been shown by Hoffa and Lorenz not to be a factor in the problem of congenital dislocation of the hip. The quadriceps extensor, with the exception of the reflected head of the rectus, is a femoral muscle; and the reflected head and the psoas iliacus are useful in flexion of the thigh, and are of but little importance in the problem to be considered. The adductor and hamstring group are manifestly the most important in their resistance to an abducting and a traction force.

If the muscles of the adductor group are examined, it will be found that the structure of the several muscles differs with their situation and probably with their function. The adductor longus, which is the most prominent superficially, is a long-fibred muscle, a companion to the gracilis, and stretched without the exercise of great force. Its attachment to the symphysis is superficial and easily divided by a knife. This muscle presents but relatively slight obstacle to forcible correction either in abduction or downward traction. The adductor brevis, a shorter and thicker muscle, is, as is the medius, attached to the upper part of the femur, and serves partly, like the quadratus lumborum, the pyramidalis and gemelli, to hold the head of the femur well into the acetabulum. These muscles are not firmly fibred and with comparatively few intra-muscular septa. They are beyond the reach of the knife in any practical surgical procedure short of amputation. Their resistance would be to extreme abduction and but little to a downward pull.

The adductor magnus, the largest and strongest muscle of the group, has a double function at its upper attachment to the femur. It acts purely as an abductor; and its fanlike insertion along the middle of the femur to the junction of the middle and lower third makes it, with its fanlike intra-muscular

septa, its toughness, its broad and strong origin, the most powerful of the whole group. The greater part of the muscle is of fleshy fibre, but the long inner edges and the lower fibres are



grouped into a strong tendon, which passes over and to the inside of Hunter's canal, and is inserted into the tubercle of the femur above the internal condyle. If this tendon is examined, it will be seen that it is one of the strongest tendons of the body. From its position and strength it is clear that it offers the strongest resistance both to downward pull and to

abducting force. If this is overcome, comparatively little resistance will be offered by the other muscles; and, unless this is overcome, but little will be gained in resistant cases either in elongating the limb or in increasing the arc of its abduction. It would appear, therefore, that, if the long tendon of the adductor magnus were divided at its insertion at the lower end of the femur (a simple and harmless procedure), one important obstacle to diminishing the resistance in correction could be removed. After this correction, force in resistant cases in the direction of abduction is much easier and resistance to a downward pull much diminished.

The hamstring group presents a formidable resistance to a downward pull. The muscles are strong, with long tendinous insertion. They can be relaxed, however, in manipulative correction by flexing the leg, and can be easily divided by tenotomy. The long insertion of the tensor vaginæ femoris or the ilio-tibial ligament presents a formidable obstacle to downward traction. If, however, the limb is abducted, the resistance of the tissue to the success of manipulative correction is slight. The ligament is superficial, and can be as easily divided by a tenotome as the planta fascia.

It would appear, therefore, that the chief muscular obstacle in manipulative reduction lies in the long tendon of the adductor and in the hamstring tendons. It of course does not follow that division of these muscles is necessary or advisable in all cases, or, if done, will make the manipulative correction easy; but it follows that this procedure, not a difficult one, will, in the resistant cases, diminish the resistance with no increase in the danger.

The following observations were made at the dissecting-room of the Harvard Medical School by Dr. L. T. Wilson, and illustrate the effect of division of the adductor magnus and other tendons on the resistance of a limb to direct traction:—

A full-term fœtus, twenty inches long and weighing nine and three-quarters pounds, was placed on its back and its pelvis fastened immovably to the table. A traction dynamometer was fastened to the right ankle. A pin was driven into the

right interior spine and another into the right exterior tuberosity of the femur. Slight traction was made to straighten the leg and the distance between the pins measured (*A*). A traction of 30 kilograms was made, and the distance measured, showing an increase over *A* of one-eighth of an inch. The capsule of the hip joint was then divided and traction of 30 kilograms made, showing an increase over *A* of one-half an inch. Tenotomy of the adductor magnus tendon, with an increase over *A* of one inch. The tensor vaginæ femoris was then cut, with an increase over *A* of one and one-eighth inches. The hamstrings were cut, with an increase over *A* of one and one-half inches. A traction of 30 kilograms was used each time. Traction was then made to see how far the femur could be drawn down, and at 40 kilograms the epiphyses at the knee gave way. Confirmatory tests on the other leg gave similar results.

An adult male cadaver was taken, and the upper half of the body removed at the level of the iliac crests. The pelvis was then fastened immovably to the table and to a heavy post. A dynamometer was fastened around the right ankle, and a tackle fastened to this and to a heavy post. A nail was driven into the anterior superior spine and another into the external tuberosity of the femur. Traction of 175 kilograms was made, and the distance between the nails measured (*A*). The capsule was then cut (see later remarks) and traction of 175 kilograms made, showing an increase over *A* of one-half an inch. The tendon of the adductor magnus was tenotomized and traction made, with an increase over *A* of three-quarters of an inch. The hamstrings were cut and tension made, with an increase over *A* of three-quarters of an inch. The fascia lata was then cut and tension made, with an increase over *A* of seven-eighths of an inch.

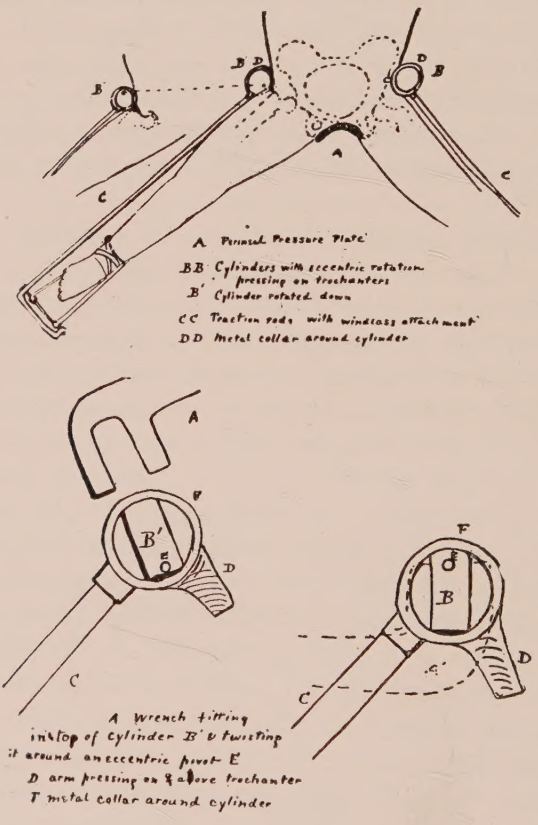
These results being far from what was expected from Experiment I., investigation was made and the capsule found not to be divided in many places, especially the back. This was fully cut and tension of 175 kilograms made, and an increase over *A* found to be one and one-half inches.

A second hip was treated in the same manner with the following results: A traction of 150 kilograms was used. Measurement of *A* taken. Increase over *A* with the capsule thoroughly divided, one-half an inch. Increase over *A* with the capsule thoroughly divided and a tenotomy of the adductor magnus, three-quarters of an inch. Increase over *A* with the capsule cut and a tenotomy of the adductor magnus and tenotomy of the hamstring, three-quarters of an inch. Increase over *A* with the capsule divided and tenotomy of the adductor magnus, hamstrings, and fascia lata, three-quarters of an inch. This case, however, was an old dissecting-room subject which had had the skin removed, and the muscles were fairly hard and dry.

Nothing could be more simple than the method of Lorenz in correcting the deformity in a young child, but in the more resistant cases the amount of force necessary brings the operator face to face with the danger either of using too great force, and causing an unnecessary injury, or too little force, and failing to effect reduction. Fractures of the femur may occur with injury to the soft tissues, due in part to the difficulty of regulating the amount of force used. There is difficulty on the part of the operator in securing the pelvis under his control, as both of his hands are occupied in the manipulation of the leg: the pelvis is left to an assistant. It is impossible that there should be complete harmony of muscular effort, and either too great or too little force may be used, too great fracturing or bruising tissues unduly or too little not overcoming the chief resistance, which appears to be the lower tendinous insertion of the adductor magnus. To stretch this muscle efficiently, it is necessary that the pelvis be held securely, that there be traction force combined with an abducting force. If this force is arranged in such a way that the trochanter is pressed upon an immovable fulcrum and the limb is sufficiently pulled at the same time it is abducted, there must be slight danger of fracture of the femur by crowding the head into the pelvis or resistant tissue. The resistance of the adductor magnus may be assumed to be less than the strength of the shaft of the bone. The ad-

ductor magnus protects from motion injurious to the soft tissues, and these vessels and nerves cannot be injured until this tendon is stretched, torn, or divided.

It is essential that the mechanical force employed should be directly under the control of the operator.


A Perineal Pressure Plate
BB Cylinders with eccentric rotation pressing on trochanters
B' Cylinder rotated down
CC Traction rods with windlass attachment
DD Metal collar around cylinder
A
B
B'
C
D
E
F
A Wrench fitting into top of cylinder B' & twisting it around an eccentric pivot E
D arm pressing on & above trochanter
F metal collar around cylinder

The necessary requirements are met with success in an apparatus devised by Mr. Bartlett, of Boston, after careful investigation of the subject and observation of cases and pathological specimens at the Children's Hospital and Harvard Medical School. A full description of the device will be published

later, but a less detailed account may be of interest. It consists of two metal cylindrical posts adjustable on a stand to press upon the pelvis above the trochanters. On these metal cylinders metal collars fit, to which a strong steel rod is secured with a windlass traction attachment. A rawhide strip hitched with a clove hitch to the padded ankle of the patient provides for traction to any desired extent, counter-pressure being furnished by a metal perineal post. The traction rods are secured to the metal collar, which plays about the cylindrical post. Abduction and adduction, flexion and hyperextension combined with a pull, are provided for. The cylindrical post acts as a fulcrum to the abducting force of the rod; but, as the centre of this motion is outside of the position of the femoral head, abduction alone will act as a force which will bring the head of the femur from above the acetabulum to its level, if sufficient additional force is applied to stretch the hamstrings and adductors. To secure direct pressure upon the capsule and any contracted fibres which prevent the descent of the femoral head, a superimposed cylinder is placed upon the trochanter cylinder; and on this a metal collar is fitted with a handle on one side and an arm on the other, fitted so as to press above the trochanter above and below the femoral neck. If this arm, while the limb is being stretched and abducted and the head pulled away from the ilium, can be forced down, the femoral neck and head will be pressed before it, provided the arm is fitted snugly around the neck and slipping is prevented. This is prevented by a cam motion of the superimposed cylinder, which is worked by a wrench. The surgeon holds the handle which directs the pressure on the trochanter, and at the same time moves the wrench, forcing the cylinder to revolve, exerting a downward pressure of any required force and with adjustable accuracy. Under this force there is no danger of a fracture of the femoral neck or head, as they are free from resisting pressure. The tissues which will be torn are the shortest tissues alone, which can be torn without danger.

The objection to this appliance is the objection of every surgeon to all mechanical aids. Few surgeons have mechan-

ical ability or training; and they prefer their unaided hands, armed, if necessary, with a scalpel. This objection, however, is not of great value. The reduction of resistant dislocation of the hip is the work of a specialist, and the specialist should train himself in the most effective methods.

In order to test the efficiency of the Bartlett machine, experiments were made on an adult cadaver; for, if the resistance of the tissues and capsule could be so far overcome as to produce a downward dislocation of the hip in an adult cadaver, it is to be presumed that its efficiency could be relied upon in the congenital dislocation of a hip of a child. The following is the result of an experiment conducted by Dr. Wilson, Mr. Bartlett, and myself at the Harvard Medical School:—

An adult male cadaver was placed in the apparatus. The ankle of the right limb was secured to the traction rod, and a dynamometer was attached to register the amount of force employed. When a traction force of 160 kilograms was applied, the limb was abducted to an angle of 50° with the long axis of the body, and the dynamometer registered a pull upon the femur of 220 kilograms. No dislocation of the femoral head was developed. The cylindrical post was then turned by means of a wrench on its eccentric and the downward pressure upon the neck of the femur exerted, with the result of a dislocation of the head of the femur one inch below the acetabulum. The experiment was repeated upon the other femur of the cadaver with a similar result. The amount of force required was not carefully registered by the dynamometer, as in applying the force to the upper eccentric the amount of abduction of the limb was lessened, thereby lowering the traction force, and the force registered upon the dynamometer remained as before 220 kilograms.

From this it would appear that no mechanical obstacle exists to forcing the femoral head downward from its fixed position by the use of force within surgical limits. Experience with osteoclasis has demonstrated that a pressure of much over 250 kilograms is borne by tissues without injury. A traction force and an abducting force combined with a downward force upon

the head of the strongly abducted femur appears to present an economy of effort.

As a complement to these experimental investigations, the principles here presented have been utilized practically at the Boston Children's Hospital in cases of congenital dislocation of the hip under treatment for the last four months.

The method of manipulative reduction with the aid of tenotomy of the adductor magnus tendon has been performed at the Children's Hospital in three cases. These cases were not of the most resistant type, but the aid given to the manipulation, making the correction much easier, was apparent.

Correction by the aid of mechanical force by the Bartlett machine without tenotomy has been done in a child of nine and in a child of six, fairly resistant cases, with success and much less effort than would be necessary by manual force. A combination of mechanical force and tenotomy was employed with great success in a child of thirteen, the reduction being made with great ease. This method has been tried in two younger children with success; but, as the Lorenz method is simple and efficient in the younger cases, mechanical force is unnecessary.

The facts which are here presented for consideration may be summarized as follows:—

(1) The resistance offered by the capsule to the correction of congenitally dislocated hips is not more important than that offered by the muscles.

(2) The chief resistance to forcible adduction is from the strong tendon of the adductor magnus.

(3) The resistance to pulling down the head comes from the hamstring group and the long tendon of the adductor magnus and ilio-tibial band.

(4) These resistant tissues can be overcome by small incisions at a distance from the hip.

(5) In the lighter cases manual manipulative reduction is sufficient.

(6) In resistant cases mechanical force which pulls upon and abducts the limb, arranged so as to also directly act upon the capsule, is of assistance.

(7) Where the tendon of the adductor magnus is so strong that an immoderate amount of force is needed in stretching, it would seem advisable to divide the chief resisting tissues rather than to incur the danger of severely bruising the tissues by the force used. The division of the tendon can be done either before the operation of forcible correction or at the same time.

II.

CONGENITAL DISLOCATION OF THE HIP: REPORT OF A BLOODLESS REPOSITION, FOLLOWED BY DEATH, WITH AN ANALYSIS OF TWENTY-THREE CASES IN PROCESS OF TREATMENT.

H. AUGUSTUS WILSON, A.M., M.D., OF PHILADELPHIA, AND J. TORRANCE RUGH, A.B., M.D., OF PHILADELPHIA, WITH PATHOLOGIC REPORT BY W. M. L. COPLIN, M.D.

The clinics held by Professor Adolf Lorenz on Dec. 11 and 12, 1902, at the Jefferson Medical College Hospital and the widespread accounts of his methods and skill naturally attracted many people to his bloodless methods of reduction of congenital dislocation of the hip. Many patients were brought for treatment by the non-cutting method that were beyond the age limit set by Lorenz, and often positively refused to have even subcutaneous tenotomy performed. This will explain the fact that patients beyond the age of seven were operated upon by the bloodless method that were considered too old for that method, and yet at least three cases were found to present conditions that rendered the reduction much easier than in some of the younger children.

All of the patients that have been operated upon at the Jefferson Hospital during and since the Lorenz clinics are in process of treatment, as six months from the time of operation have not yet elapsed. It is proper to speak of them at this time only as to the reduction; and later, when their plaster casts are removed, the results can be determined.

The members of the orthopedic department who assisted Dr. Lorenz on December 11 and 12 were H. Augustus Wilson, J. Torrance Rugh, F. E. Dolson, T. D. Taggart, with G. J. Schwartz, etherizer, supplemented by Dr. Frederick Müller and D. D. Ashley. The twenty-three hips operated upon in-

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clude eight done by Lorenz and the above-named assistants, thirteen done conjointly by the staff of the orthopedic department, and two done outside of the hospital by Dr. Rugh. The details as practised by Lorenz have been most critically carried out. It was deemed unwise to attempt the least departure from the methods which Lorenz with his vast experience and

Case No.	Name.	Sex.	Age.	Date.		Operator.
1 and 2	R. C.	Girl	21 months	Dec. 11	Double	Lorenz, assisted by Müller, Ashley, Wilson. Rugh, Dolson, and Taggart.
3	R. E. C.	Boy	20 "	"	Left	
4	A. P.	Girl	9 years	"	—	
5 and 6	M. I.	"	4 "	"	Double	
7 and 8	M. G.	"	4 "	Dec. 12	"	
9	G. R.	"	7 "	Mar. 3	Left	Wilson, assisted by Rugh, Dolson, and Taggart.
10 and 11	H. L.	"	2 "	Feb. 6	Double	
12	K. C.	"	7 "	Jan. 7	—	
13	A. H.	Boy	4 "	Mar. 2	Right	
14 and 15	E. K.	"	10 "	Feb. 11	Double	
16	M. H.	Girl	8 "	Mar. 21	Right	
17	R. M.	"	7 "	Mar. 3	Left	
18 and 19	B. D.	"	7 "	Mar. 18	Double	
20	E. R.	Boy	9½ "	Apr. 15	Left	
21	R. M.	Girl	3 "	Apr. 20	"	
22	K. McF.	"	3 "	Feb. 1	"	Rugh.
23	J. S.	Boy	18 months	Mar. 8	"	

12 girls { 5 double / 7 single { 5 left. / 2 right.

5 boys { 1 double / 4 single { 3 left. / 1 right.

Total { 6 double / 11 single { 8 left. / 3 right.

6 cases . . . . . 2 years and under.
2 cases . . . . . 2 to 3 years of age.
5 cases . . . . . 3 to 4 years of age.
5 cases . . . . . 6 to 7 years of age.
3 cases . . . . . 8 to 9 years of age.
2 cases . . . . . 10 years of age.

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consummate skill had demonstrated before a most critical audience of 700 medical men. That we lacked his ability was of course to be expected, but each of us became more and more convinced with each case, that in suitable cases great force was unnecessary when skilful manipulations were employed. The very great force that is sometimes spoken of in connection with this method is employed only in those older patients in whom use has developed strong and resistant muscles and fibrous materials in relations with the hip or when unsuccessful

attempts have been made at reduction. Professor Lorenz found the reduction to be accomplished with ease in the first four hips, notwithstanding that one of the patients was nine years of age. The next one, aged four, proved to be extremely difficult, and taxed Dr. Lorenz's skill and strength almost to the limit, but finally yielded and demonstrated a satisfactory reduction.

The last patient, aged four, with double dislocation, had been placed under ether to be in readiness, but could not be operated upon because of the difficulties encountered in the former case. The child had been under ether for thirty-five minutes before it was decided to postpone reduction in her case. She made a satisfactory return to consciousness. The day following she was again etherized, and Dr. Lorenz reduced both hips. She went to the ward in good condition at 6 P.M.

The following notes are given by Dr. P. H. Moore, the house surgeon. The phenomena were also witnessed by Dr. Wilson:—

At 9.15 P.M. the right hand was observed to begin to move in an indefinite, convulsive manner, and the patient rapidly passed into a state of stupor. The eyes became fixed, pupils dilated, and did not respond to light, the tongue protruded, and frothlike saliva dribbled from the mouth. The face was markedly pallid and cold. Breathing was somewhat slower than normal and labored. Occasionally the lower jaw moved slightly, but there was no biting of the tongue. The pulse was not rapid, but decidedly weak. Later it became rapid, and could not be counted, owing to arm movements. The right leg was several degrees lower in temperature than the left, and offered almost no resistance to manipulation. In three-quarters of an hour the stupor began to lessen, respiration became more nearly normal. A slight flush came to the cheeks, the tongue retracted, and the muscles of the face showed some twitching movements. The right hand underwent convulsive movements, the head was turned violently from side to side. There were mild clonic convulsions of the muscles of the back, and speech, slowly restored, became coherent. In about one and three-quarters hours the condition was practically the same as before the attack. The child did not sleep. At 12.30 (same night) there was a much briefer attack, showing some of the above phenomena in modified form. Restless sleep until morning. There was no recurrence, and no resulting paralysis. The child was languid.

Professor Lorenz, in a personal communication, said (after reading the above record of the phenomena) that he had never had a case in which convulsions followed the operation, and he considered shock and trauma as the cause of this case.

K. C.—The radiograph was relied upon, and it showed the condition of the acetabulum and the head of the femur to be favorable. There had been a cutting operation performed two years previously, and it was stated that this was for the evacuation of an abscess. The head of the bone seemed to be easily pulled down to Nélaton's line before the reduction was attempted. It was discovered later, during the manipulations, that there was no head to the femur; and we inferred that it had been removed at the operation referred to. It was found to be impossible to obtain any information as to what was really done, although careful inquiries were instituted. The hospital where the child was operated upon was under a staff that was not in affiliation with members of the American Medical Association.

M. H.—Some considerable œdema of the right labium majus developed about ten hours after reduction of the hip, which necessitated catheterization for twenty-four hours; but it then subsided, and normal functions were re-established.

With these few exceptions the patients all progressed favorably, and, after remaining quietly in bed for from three to four days, were permitted to sit up, and were usually sent out of the hospital within a week from the time of operation. They were kept under observation by physicians in attendance upon the families, and reports were made to the Jefferson Hospital from time to time.

In not one case has there been any evidence of paralysis or other nerve disturbance. Pain on attempting to use the leg operated upon has generally persisted for two to four days, and after that was only present when the hamstring tendons were stretched in those cases in which some flexion of the knee persisted. This, however, soon subsided, and freedom from pain or annoyances of any kind has been the condition in all cases, excepting only the inconvenience of the plaster cast and the position in which it held the leg. It was a matter of great interest to see how quickly the children learned to adapt themselves to the posture of the affected leg, and to use it in walking where only one hip had been replaced.

We were surprised to see how little attention Lorenz paid to the very carefully prepared skiagrams that accompanied

each of the twenty cases submitted to his inspection and selection for his clinics on December 11 and 12. His reliance on clinical inspection of the case, the thorough manner in which he determined the existing conditions and the prospects for reduction, impressed every one with his rapidity and certainty of action and decision.

Subsequent experience has convinced us that the well-recognized possibility of variously interpreting radiograms renders their use of much less real value than would naturally be supposed.

It cannot be disputed that aid can be obtained from a careful study of a radiogram in direct connection with the analysis of the clinical phenomena, but the latter are to be relied upon for definite facts as to the condition of those factors about the joint other than bone which play equally important parts in resistance to reduction. In the case of M. I., that Professor Lorenz found the most difficult of all to reduce, the radiograph showed a most favorable condition, and was therefore most misleading. The same thing has been found in several other cases, notably in E. K., age ten years; and the radiograph indicated unfavorable conditions for the bloodless method, which was attempted only as a preliminary measure in order to prepare him for a cutting operation to be performed later in accordance with the teaching of Lorenz. Reduction, however, was accomplished by us with far greater ease and certainty than in many of the other cases. The only fatal result is here fully recorded:—

On March 10, 1903, B. D., a girl, aged seven and one-half, was first seen by Dr. Rugh, she having been sent by the family physician, Dr. I. A. Fries. The family history showed tuberculosis on the father's side, a brother having died of pulmonary tuberculosis, but no history of any similar deformities on either side of the family.

The patient was the oldest of three children: the second one, however, died in its fourth year from meningitis. Birth of the patient was normal. She had measles at three years of age. All three of the children had very large heads when born; and the disproportion remained quite marked, giving the appearance of hydrocephalus. Patient never was a robust child nor a hearty eater, but seldom complained of illness. When nearing two years of age, she began to walk; and the family physician began to notice that she appeared much shorter when standing than when lying. A careful examination revealed to him a double congenital misplacement of both hips up-

ward and backward on the dorsum ilii. He immediately sent her to the orthopedic department of a hospital in this city, where she remained under treatment for nearly two years. The treatment consisted in extension for over a year and then the application of plaster of Paris with the legs in the position of slight flexion and slight abduction. Radiographs taken at the time showed the heads of the femurs to be *opposite* to, but not *in* the acetabula. Braces were later applied and worn for two years, but the hips remained misplaced and her gait was very much impaired. When she was examined on March 10 and later, she presented the following appearance: A rather delicate-looking child of ordinary height and somewhat under weight. The calvarium was very broad, the face somewhat narrow, accentuating the rachitic tendency, and the veins of the forehead and neck were quite prominent. The skin was almost transparent, and presented a very waxy appearance. The chest was spare, but of normal size, the abdomen retracted, the extremities thin, and the muscles weak. There was marked lordosis of the lumbar spine, and the gait was very awkward and rolling. The knees presented a pronounced condition of genu recurvatum and knocked together in walking. The ligaments of the several joints of the lower extremities were very much relaxed, allowing considerable abnormal motion. The feet were in the position of valgus, and the toes were markedly everted. The hips were very freely movable, and on standing the femoral heads and trochanters stood out prominently. They could be drawn down *to* the acetabula, but not *opposite*. Muscular control was good, but the muscles were weak. The adductors were very much shortened, as were also the flexors; and the thighs could not be abducted in the line of right-angled flexion beyond 45°. The radiograph showed fairly well-developed femoral heads and acetabula. There being no apparent counter-indication present, bloodless reposition was advised and assented to by the parents after the dangers were outlined to them. The patient entered the Jefferson Hospital on March 17, and was prepared for operation in the manner usual at that institution; namely, regulation of the diet, bowels and secretions, with rest in bed for a period of not less than twenty-four hours. The examination of the heart and lungs was negative, and the urine examination was as follows: urine clear, straw-color, acid reaction, faint trace of albumen, 1.5 per cent. urea, amorphous urates, squamous epithelial cells, and a few leukocytes. The operations were performed the following day at eleven o'clock by the writers, assisted by Drs. Dolson and Taggart, and the anæsthetic was administered by Dr. G. J. Schwartz, the official anæsthetizer for the orthopedic department. The right hip was first attempted, the various steps of stretching and tearing the adductors and flexors being carefully followed out, and then external rotation and circumduction with hyperextension in the abducted position was employed, but reduction failed. A very significant thing occurred while tearing the adductors, but was considered at the time as not having any special significance. As soon as abduction was made in the tearing of the adductors, the skin over these prominent muscles where massage was used began to tear, showing the low state of vitality present. This occurred on both sides; and, wherever pressure was made by the hands, for means of reduction, a blue mark appeared.

After several more attempts in the same manner were made, the yarn rope was attached to the ankle and traction made to stretch the capsule downward, as well as to bring the head opposite the acetabulum. The hip was manipulated while this was being done; and then reduction was again attempted, but was not accomplished. While the hamstrings were being stretched, something was heard to snap, and it was thought to be the tendons of the semitendinosis or semimembranosus muscles; but this was evidently when the ischium was fractured, although it did not seem like a bone breaking. When traction was being made on the femur, a tearing sound was noted, and was supposed to be the Y-ligament; but evidently the femoral neck was fractured instead, although it could not be recognized at the time. After twenty-five minutes' work by both operators, the head was thought to be placed upon the acetabulum, as the leg could not be straightened at the knee; and this was given by Lorenz as the sign of replacement.

The child's condition seemed good, and it was decided to attempt the reduction of the left hip at once. No greater difficulties to reduction appeared in the left leg than were encountered in the similar stages with the right, but the skin likewise gave way over the adductor tendons. The strong resistance of the hamstring tendons induced the operators to cease further efforts after fifteen minutes' time, when it was realized that reduction by the bloodless method was impossible without unduly prolonging the manipulations that were made. It was decided to place the legs in the best possible position for repair of the torn structures, and subsequently to resort to the intermediary operation of cutting down upon the joint and stretching the capsule and removing such other obstacles as might be found. When the legs were in position for the plaster cast, it was found that the left leg, like the right, gave the test condition of resistance to extension of the leg, and led the operators to believe that the head on this side also rested on the acetabulum. The error in this respect was demonstrated at the post mortem. Both legs were then placed in the position of hyperabduction and hyperextension ("frog position"), and plaster of Paris applied by Drs. Dolson and Taggart.

The following notes are given by Dr. C. A. Dexter, the house surgeon:—

The child was brought up from clinic at half-past twelve o'clock. The pulse was rather weak and rapid, and atropine sulphate, 3 mg. ($\frac{1}{200}$ grain), and strychnine sulphate, 2 mg. ($\frac{1}{30}$ grain), were given hypodermically and external heat applied, and the child reacted very well. On coming from under the influence of ether about two hours later, appeared to be in fair general condition. Later in the afternoon complained of some thirst, but not so much as the average ether patient. Was a little restless, but not so much as the usual case of a reduction by the same method. Was not nauseated, and did not vomit during the afternoon. About 9 P.M. vomited about two ounces of a dark brownish fluid, and once or twice during the night after this. Had stimulation during the night. After 10 P.M. the child became delirious, the delirium being of a mild talkative character and continuing throughout the night. At 8 A.M. the temperature was down to 97°, and external

heat was applied. Pulse was somewhat rapid and weak, and coffee and whiskey by enema, atropine and strychnia hypodermically, were given. The child apparently had begun to react, the pulse getting stronger. Was now perfectly conscious, and said that she was not in any pain.

At 9 A.M. Professor Wilson was telephoned for, and arrived ten minutes later. Instruments were in readiness for saline infusion, but the child's condition became so rapidly worse that an opportunity to use them was not given.

At 9.35 A.M. her condition seemed somewhat improved.

At 9.40 A.M. there was a marked change: breathing suddenly became gasping and superficial, pulse absent at the wrist. Stimulation was again used hypodermically; but the breathing quickly became worse, the heart-beats weaker, and with a few convulsive gasps the child died at 9.45 A.M.

TEMPERATURE CHART.

Date.	Hour.	Resp.	Pulse.	Temperature.
March 17.	4 P.M.	20	90	98.4°
" 18.	8 A.M.	20	80	97.0°
" 18.	1 P.M.	32	100	98.9° after operation.
" 18.	3 P.M.	32	112	101.0°
" 18.	6 P.M.	36	104	101.4°
" 19.	8 A.M.	38	132	96.4°
" 19.	9 A.M.	40	156	99.4°
" 19.	9.45 A.M. died.			

In the light afforded by the very careful post-mortem examination by Dr. Coplin in the presence of the staff of the orthopedic department, it may be noted that this was a case in which replacement could not have been secured without removing the ligamentum teres, and that there was no way of predetermining the existence of the obstacles to the bloodless reposition.

The main factor was the length and size of the ligamentum teres, which more than filled the acetabulum on each side, and therefore the sign which indicates reduction—that is, the slipping out of the head from the acetabulum as the leg is brought into an extended position—was absent. While this one factor (*i.e.*, the ligamentum teres) was sufficient to have prevented reduction, the very thick capsule was elongated and had a tendency to fold in between the head and the acetabulum again, preventing the clear sound that occurred in other cases when the head, it is believed, entered the acetabulum. On both sides the articulating surface of the head was found placed above the posterior rim of the acetabulum, in which position it was

placed at the time of operation, and was, therefore, decidedly anterior to the position which it had formerly occupied on the dorsum of the ilium. Just when or how the three factors occurred it is impossible to determine; for, while something was felt by the operators which was unusual, it did not partake of the nature of breaking bone, but closely resembled tearing fibrous tissue, and was so considered at the time of operation. The tearing sound was communicated to the operator who was holding the pelvis as well as to the one who was manipulating the left leg. It was a diffused sound, and its origin could not be located. Twice this occurred, but a third fracture which was found post mortem cannot be accounted for. The bone ends in all three fractures were in close apposition, clearly indicating that, if death had not ensued, repair would have taken place in favorable position. That no fractures occurred upon the left side is due to the fact that efforts at reduction ceased in about one-half the time spent upon the right leg in realization of the inexpediency of continued efforts. The torn skin over the adductor tendons was accepted as an indication of the low vitality of the patient, as this did not occur in any other case, although several had had ecchymotic spots of quite large size for varying periods of from one to two weeks.

As to the force used, it can only be compared with other cases, and may be stated as having been skilfully applied, and was much less and for a shorter time than in some of the other cases, and especially so in contrast to the fourth patient upon whom Lorenz operated. The forcible manipulations appeared to be suitable to the conditions, and there was no recognizable counter-indications. The previous condition of the child gave no distinct evidence of her deficient vitality; and it would seem as though the methods employed at reduction were less responsible for the death than the anæsthetic, although the entire procedure must be considered.

The pathologic conditions found in the lungs and kidneys, which gave decided indications of very recent origin, could be caused by ether anæsthesia for one and one-half hours. Pneumonia following ether is sufficiently common in cases in which

the operative procedures are of a mild character; and whether acute nephritis is likewise a sequel of ether intoxication is still a disputed point with pathologists, but the evidence in this case is strongly affirmative.

While the condition of the patient did not indicate shock at the cessation of reduction manipulations, it was felt that the patient should be most critically safeguarded in every respect. When Dr. Schwartz, the official anæsthetizer of the department, was obliged to leave at the beginning of the application of the plaster cast, it was deemed expedient for Dr. Wilson to take his place while Drs. Dolson and Taggart applied the plaster bandages, with Dr. Rugh maintaining correct position of the legs. This disposition of the responsibilities is a satisfaction to all concerned, in that it is believed that everything was done to secure a favorable recovery in this case.

The full details of the post mortem by Dr. Coplin are here given as an essential feature; and their value is enhanced by the disinterested manner in which the report is made, hoping that the conditions, methods, and results will be of service in guiding others in cases of this kind.

Pathologic Report.

Autopsy protocol, case of B. D., female, seven years, white. Drs. H. Augustus Wilson and J. T. Rugh, surgeons. Died March 19, 1903, at 9.45 A.M. Autopsy held March 19, 1903, at 1.45 P.M.

Anatomic Diagnosis.—Bilateral congenital dislocation of the hip. Perforate foramen ovale. Persistent thymus. Atheromatous arteritis of aorta and coronary trunks. Acute catarrhal tracheitis. Acute catarrhal bronchitis. Acute catarrhal pneumonia. General tuberculous lymphadenitis. Acute diffuse hemorrhagic nephritis. Latentor obsolescent rachitis.

External Examination.—The body is that of a fairly well-nourished female child. Rigor mortis is quite marked in the upper extremities and the calf muscles, but is slight in the muscles of the thigh. There is marked suggillation on the posterior aspect of the body, neck, head, and arms. The thighs are flexed at right angles to the body in the axillary lines, and the legs at right angles to the thighs. The thighs and pelvis are encased in the plaster dressing commonly used after bloodless operation. This is removed in the usual manner, using every precaution to prevent any alteration in the relation of the enclosed parts. In spite of every care there was some movement of the right femur; and it was thought possible that it might have been misplaced, although subsequent findings did not support the view.

From the symphysis to the extreme margin of the right inner condyle

of the femur is 24 cm: on the left side the distance between corresponding points is 32 cm. The circumference of the right thigh, 8 cm. above the inner condyle, is 20 cm: 22 cm. above the inner condyle it is 29 cm. The circumference of the left thigh, 8 cm. above the inner condyle, is 19 cm., 22 cm. above the inner condyle is 28 cm. The following external marks are present upon the right inferior extremity: On the inner aspect of the ankle, posterior to the malleolus, are a number of ecchymotic spots, petechial in character, distributed over an area of 4 cm. in the axis of the limb, and 3 cm. transversely. From this point downward the superficial veins are conspicuous, but not palpable, and clearly not thrombosed. Five centimetres above the inner condyle is a pinkish, ecchymotic area 1.7 cm. in length in the axis of the limb, and 5.5 cm. circumferentially. From the lower third of the thigh upward, on the anterior surface, the skin shows pinkish-red mottling almost or quite to the junction of the skin covering the pelvis. This mottling is also present on the inner surface, but less marked posteriorly. Five centimetres from the symphysis, beginning 2 cm. below Poupart's ligament and extending downward, is an abrasion 2.8 cm. in length by 1 cm. in width: 5.5 cm. from the symphysis is a second abrasion nearly parallel with the first, 2.5 cm. in length and 1 cm. in width. At these points the epithelial layers of the skin are stripped and possibly also the connective tissue layers, although the subcutaneous tissues do not protrude or the skin retract: the eroded areas are covered by glazed lymph, through which the ecchymotic bases can be seen. The areas just described are in a larger field of discoloration, greenish-purple with darker purplish mottling, and extending from a point 2.5 cm. to the right of the symphysis to a distance of 15.5 cm. from the symphysis and becoming continuous with the irregular mottling referred to as present in the lower part of the thigh. The axis of this area corresponds to the course of the femoral artery; and the area measures, transversely, 9.5 cm. It extends above Poupart's ligament 3 cm., and from the median line to the anterior superior spine. The skin of the perineum and the cutaneous structures of the vulva are possibly a little redder than normal, while the mucosa of the vulva is suffused with blood and purplish in color, the suffusion being most marked around the urethral orifice. The large area of discoloration already described on the right thigh is soft and almost fluctuating near its centre and quite resistant, almost dense at the margin: at the base, near Poupart's ligament, it is quite dense.

Left extremity: near the ankle are areas of discoloration, petechial hemorrhages and prominent veins essentially of the same kind as described on the opposite limb. On the inner aspect of the leg just within the margin of the tibia is an old ecchymotic patch 7 cm. below the upper end of the tibia. It is purplish with greenish-yellow margins, oval in outline, and possesses a maximum diameter of 1.8 cm: 5.5 cm. above the inner condyle is a pinkish-red area of discoloration, the long axis being transverse to the long axis of the limb, 6 cm. in length and 1.4 cm. in width. Just over the patella is a small ecchymosis 0.7 cm. in diameter. The anterior surface of the thigh shows the same pinkish mottling already described as present on the opposite limb. Four and seven-tenths centimetres to the left of the pubis is an irregular laceration of the epidermis and derma, 3.7 cm. in length, 0.4

cm. in width, bridged here and there by fragments of the deeper layers of the skin and marginated by smaller fissured lacerations, 1 to 2 cm. in length. The long axis of this area is parallel to the axis of the trunk. It is situated near the base of a large purplish-green area, irregular in outline, beginning 3.2 cm. from the symphysis and extending in the axis of the limb 9.5 cm., and in the axis of the trunk 9.5 cm. This area of discoloration extends 2 cm. above Poupart's ligament, at which point it is 4 cm. in length (this latter measurement made parallel with Poupart's ligament). The area is less tense than the corresponding area on the opposite side, but similarly colored and with denser margins.

The lower part of the abdomen is flat, or nearly so, the costal margins prominent, and the epigastrium slightly bulging. There is a suggestion of a rachitic rosary. The sternal ends of the clavicles are slightly enlarged, and the sternoclavicular attachments very relaxed, almost permitting dislocation. The shoulder and wrist joints, and, to a lesser degree, the elbow, knee, and ankle joints are relaxed: the amount of lateral movement at the wrist and shoulder joints is strikingly in excess of the normal. The lower end of the radius and tibia (right and left) are apparently enlarged, but not conspicuously so. We were not allowed to incise them: they may have been slightly rachitic.

The forehead is prominent, the calvarium large, suggesting the general contour of a slightly hydrocephalic head, the lips are purplish and dry, the pupils are dilated and the eyes slightly sunken.

The axillary, cervical, and submaxillary lymph-nodes are notably enlarged: in the axilla, nodes possessing diameters of 1.5 cm. can be felt. The anterior cervical nodes are smaller, but distinct chains can be palpated along the posterior borders of the sternocleidomastoid muscle. Under each mandibular angle is located a node approximately 1 cm. in diameter. As none of these areas was subjected to dissection, the measurements given could be estimated only. The tonsils appear slightly enlarged. The oral mucosa is pale, but without any discernible lesion.

Internal Examination.—The subcutaneous fat over the chest and abdomen, along the median incision, is scanty, but normal in color and texture. The musculature of the chest and abdomen is normal in color and texture, but rather poorly developed.

The peritoneum is normal, the transverse colon considerably distended. There is purplish discoloration of the tissues of all the right half of the pelvis extending down behind the rectum, along the anterior sacral border into the broad ligament, slightly over the posterior part of the bladder and upward anteriorly 4 cm. above Pourpart's ligament, corresponding to the already described area of discoloration on the external surface: laterally, on the right side, the purplish shading reaches a point just above the head of the colon. This irregular area of purplish mottling and suffusion is not palpable, although its ecchymotic character is fairly marked. There is slight ecchymosis in the neighborhood of the femoral ring of the left side.

The pleurae are dry, as is the pericardium. Both serosae are normal.

The thymus is exceptionally large, extending anteriorly below the middle of the heart, latterly into the mediastinum, and above to and partly occupy-

ing the suprasternal notch. It is an arrow-shaped organ, 9 cm. in length, .5 cm. in width, and 0.7 cm. in thickness. It extends along the trachea as a single body for 1.5 cm., then divides into two equal parts more or less cylindrical in outline and 2 cm. in length that are projected upward along the sides of the trachea. Weight, 20 grams.

Histologically,* the organ shows no specially noteworthy abnormality. The secondary lobules are much larger than normal in a child of this age. The increased volume seems to depend upon persistence or hyperplasia of the lymphoid elements. The differentiation between periphery and cortex is ill-defined. The bodies of Hassall (concentric corpuscles) are unusually abundant. At a few points rhexis has occurred, and small areas of intercellular hemorrhage, not at any point large or abundant, are occasionally seen. Lipomatous substitution of the adenoid tissue is not at any point in progress. It might be well to note that in many cases persistence of the thymus has been found as a part of the morbid anatomy of rickets.

Heart: The cavities of the right side are distended and occupied by clots, which for the most part are white or the color of chicken fat, with superimposed purplish coagula. The left side is empty. The valves and orifices of the right and left sides appear normal, except as noted below. The foramen ovale is obliquely patulous, the opening barely transmitting a grooved director. It is 0.3 cm. by 0.25 cm. in size. There is a small patch of atheroma on the ventricular aspect of the anterior leaflet of the mitral. The myocardium is pale, but fairly firm in texture. Weight, 85 grams.

Histologically, the myocardium shows no conspicuous abnormality. Occasional fibres are slightly granular: fat is absent. The smaller coronary branches are not altered.

The presence of even a small atheromatous plaque in the mitral leaflet in one so young indicates the existence of some noxious influence, possibly syphilis, or it may be rickets, as the relatively small heart and thin walled vessels would seem to refute any suggestion that the alteration here noted depended upon heightened vascular stress. The change described below as present in the aorta also supports either of the former views.

The aorta just above the aortic orifice is the seat of a diffuse yellowish infiltration that surrounds the coronary arteries, completely encircling the aorta, and has thickened the aorta, particularly in the neighborhood of the coronary orifices. The thickening of the aortic wall is at the expense of the lumen. The right coronary artery is surrounded by a distinct zone of such infiltration. Other macroscopic evidence of arterial disease was not found beyond the aorta.

Histologically, longitudinal and transverse sections of the infiltrated aorta show the usual changes of an atheromatous patch. The intima is intact and slightly thickened: the subintimal elastica fragmented at the margin of the area and not demonstrable near its centre. The media is partly involved, and between the altered media and intima is a necrotic accumulation containing cellular débris, fragments of elastica and granular detritus. Evidences

* For convenience in reference the histology of the organ is incorporated with the autopsy record. The technic has been practically the same for all. Selected blocks of tissue were fixed in Bensley's solution, washed, dehydrated, infiltrated with paraffin, sectioned, and stained by approved laboratory methods. The findings in each instance are epitomized in this report.

of calcific change are wanting. Sections so oriented as to include the coronary exit show that the process extends but a short distance (1 mm. or 2 mm.) into that vessel. As yet the sectional area of the coronary orifice has not been altered.

Left lung: The superior lobe contains a number of small areas of atelectasis 5 mm. to 10 mm. in diameter, irregular in outline, evidently recent. In the base of the lower lobe anteriorly is a larger, partly collapsed area, not, however, airless, measuring 0.5 cm. by 1.5 cm. The subpleural tissue posteriorly is œdematous and the seat of numerous petechial hemorrhages: similar hemorrhages are also present on the diaphragmatic surface and along the anterior margin of the organ. Centrally and toward the upper portion of the lower lobe is a purplish-red area, 2.5 cm. in length and 1 cm. in width, that appears quite airless. Toward the base are numerous smaller areas possessing the same characters. Areas of solidification varying in size from 0.5 cm. to 1 cm. are also present in the upper lobe. Weight, 110 grams.

Right lung: This organ is, in a general way, the seat of changes essentially the same as those noted as present in the left. They are a little more marked posteriorly, and less evident at the apex and along the anterior and diaphragmatic aspects. Weight, 125 grams.

The larger bronchi of both organs are the seat of œdema and redness of the mucuous membrane, and often contain a frothy red mucus.

There is a mucosanguinolent frothy fluid in the trachea.

Histologically, the changes present in the air passages and lungs may be summed up as (1) catarrhal bronchitis, (2) bronchiolitis, (3) lobular pneumonia. None of these is very advanced, although all the blocks examined show the changes. The mucosa of the trachea and bronchi, large and small, shows epithelial desquamation, serous and leukocytic infiltration of the submucosa of the large tubes and peribronchial tissues of the smaller. Here and there throughout the sections are lobules or parts of lobules inundated with mucus or overdistended by compensatory efforts. There is very little interalveolar cellular infiltration.

Properly stained preparations show the presence of an organism possessing the morphology and tinctorial characters of the pneumococcus. The bacteria are not numerically conspicuous, although widely distributed.

The peribronchial and mediastinal lymph-nodes, and especially those situated at the bifurcation of the trachea, are enlarged and slightly matted together. The larger masses vary in size from 0.5 cm. to 1.5 cm. in diameter, are tense, evidently swollen and, on section, contain grayish dotlets 1 mm. to 2 mm. in diameter, possessing the macroscopic characters of tubercles. The histology of these glands will be given below with other lymphadenoid groups.

The spleen is relatively firm, its pulp of normal density, possibly a little paler than normal. The adenoid groups are not perceptibly changed. Weight, 55 grams.*

The adrenals are normal in size and general appearance.

*Unfortunately, the pieces of spleen, adrenal, stomach, duodenum, and pancreas, were not set aside for histologic study or were mislaid. There is no reason to suppose that a histologic study of any of these organs would throw additional light on the cause of death: possibly it might have shown lesions corroborative of the general condition indicated by what was found in other structures.

The left kidney has retained its fœtal lobulation: it is rather hyperæmic, soft and cloudy. The cortex is slightly swollen; the labyrinthian areas hyperæmic; the malpighian bodies not more evident than usual. The capsule is easily detached; the stripped surface is red and œdematous; the redness is rather punctate. The pelvis is normal. Weight, 60 grams.

The right kidney shows essentially the same changes as the left. Weight, 55 grams.

The ureters are normal. The right ureter can be traced downward through the area of hemorrhage; there is no evidence of pressure on it within this area; the mucosa is normal.

Histologically, the kidneys manifest no evidence of any old lesion, but show to a most marked degree the presence of alterations of recent origin. The labyrinthian areas are frequently the seat of irregular inter- and intratubular hemorrhage. The hemorrhages are recent, the extravasated blood unaltered: tubules are frequently distended with blood-casts. The epithelium of the convoluted tubules is often granular and stains defectively: at no point has it desquamated. The malpighian tufts are frequently engorged, but in exceptional instances only is a tuft found in which free hemorrhage has occurred.

Bladder: With the exception of the subserous suffusion, already mentioned as present under the peritoneal coat, the organ shows no gross lesions. Urethra normal, except at the external orifice, as previously described.

The internal and external genitalia show no noteworthy abnormality not already recorded.

The œsophagus, stomach, and intestines show no important change. The agminated patches are inconspicuous, the solitary follicles prominent. The mucosa of the stomach and lower end of the œsophagus show slight erosions, thought to be evidences of post-mortem digestion.

The pancreas is partly annular, extending about half-way round the duodenum. It shows no gross lesion. Weight, 45 grams.

Liver: The biliary passages are patulous and normal. The gall bladder lightly distended by apparently normal bile. The superior surface of the right lobe of the liver shows several areas grayish-white in color, irregular in outline, 0.2 cm. to 0.5 cm. in diameter, apparently focal necroses. Posteriorly, the organ is lightly congested. There is no special noteworthy lesion.

The mesenteric glands are notably increased in size. Some of the largest are ovoid, measuring 1.5 cm. by 2 cm.: they are fairly numerous at many points, but particularly so in the sigmoid area. They are equally enlarged, though less abundant in the ileocæcal region. The enlarged nodules are often tense, the exterior mottled, showing areas of grayish or yellowish-white on a rather pinkish background. The investing peritoneum is smooth and transparent, and the nodes easily freed from the adjacent tissue. On section they are grayish, succulent, and contain minute whitish areas that suggest tubercles: at points there is a suggestion of caseation, but nowhere is this change striking.

The retroperitoneal enlargements are evident, but less abundant. On section these nodes show the same general characters as those in the mesentery.

Macroscopically, the axillary, cervical, submaxillary, mediastinal, peribronchial, mesenteric, and retroperitoneal lymph-nodes show essentially the same features. The following histologic description is based on examination of the mesenteric, mediastinal, and peribronchial systems.

Histologically, the lymph-nodes manifest those changes characteristic of a moderate degree of widely disseminated infection by the tubercle bacillus. Distinct caseation is scantily present in occasional nodes from all the systems examined: it seems apparent that the peribronchial and mediastinal groups are most involved; they are also the seat of mixed infection. Many nodes are not caseous, nor do they contain macroscopic nor microscopic tubercles, although some of them contain tubercle bacilli. In such nodes the peripheral and follicular sinuses are distended by uninuclear leukocytes and desquamating endothelial cells from the walls: the medullary cords are also closely packed. Occasionally in the peribronchial system fibrin can be demonstrated, indicating an acute and active character in the process. In some of these glands pneumococci were identified.

Dissection of the thighs and pelvis: From the median incision two incisions are extended laterally to about the centre of Poupart's ligament and then downward on the anterior surface of each thigh, following, as nearly as possible, a line parallel with the axis of Scarpa's triangle and extending beyond the area of notable discoloration. Inoculations are taken from beneath the deep fascia, and finally the arterial and venous trunks partly exposed. Water is forced through the abdominal aorta into each iliac artery until the vessels distend fully. The water oozes from the adjacent infiltrated tissues, while the arterial trunks become tense. The veins are similarly tested, and with like results. These tests satisfactorily establish that none of the large trunks, or important branches, are lacerated. That the vessels are patulous is also established by opening them at Hunter's canal and observing that the water flows through without obstruction: the thin-walled femoral and iliac veins can be seen to be free from any obstructing or mural thrombus.

The dissection is now extended, exposing the muscles of the thigh and finally the hip joints. The anterior crural nerves and their branches are macroscopically intact. There is considerable difficulty in identifying the various anatomic structure on account of the extensive hemorrhagic infiltration to which the superficial discoloration already described evidently is due. The condition on the right side will be described in detail, followed by an account of the left side.

In the cellular and fatty tissue beneath the deep fascia are loculi containing coagulated blood: these small irregular cavities vary in size, the largest scarcely exceeding 1.5 cm. in its maximum diameter. Evidently, a number of these spaces may communicate either directly or indirectly. The total amount of blood extravasated cannot be estimated with any degree of accuracy, but is considerable. The distinct cavities containing blood are in the neighborhood of the femoral sheath and beneath the sartorius muscle. (Later a few small loculi were found behind the bone: they were not, however, of notable size.) The inner border of the sartorius and the anterior part of the adductor longus are suffused to a moderate degree. The muscles forming the floor of Scarpa's triangle (iliacus, psoas, pectineus, and, in part, the long

and short adductors) are also suffused with blood. The tensor vaginæ femoris and gluteal muscles contain but a few points of interstitial hemorrhage. The intense purplish-black staining of the muscles renders it quite impossible to determine accurately just how much, if any, real laceration is present. There are valid objections to complete dissection of the limb, but a fairly exhaustive examination of the exposed muscles fails to disclose any exten-

Right hip joint. A, thickened capsular ligament. B, capsular ligament at point of maximum thickening. C, ligamentum teres occupying the greater part of the acetabulum; the notable elongation is shown by the relaxed ligament extending to the head of the femur. D, the leader from D is over the line of fracture in the neck of the femur; the point of separation does not show, as it is covered by periosteum. E, fracture of ischium; the periosteum has been divided, showing oblique line of separation. F, second fracture of the ischium; the periosteum is intact and the line of fracture indicated only by the slight darkening due to subperiosteal hemorrhage.

sive single or massive laceration, although what might be termed a fibrillar dissociation is present in nearly all the dissected muscles already mentioned. The solutions in the continuity of solid muscle bodies are oblique, mixed longitudinal and slightly oblique, but not directly transverse fissurings. The muscles are notably flaccid, probably as a result of post-mortem rigidity and coagulative changes in the extravasated blood.

If there be any laceration of branches of the internal iliac artery, a fairly comprehensive examination of the areas in which they are distributed, reenforced by the hydrostatic test already described, fails to disclose it. The intrapelvic suffusion previously mentioned is found on incision to be in the cellular tissue immediately beneath the serosa only, and, so far as can be determined, has reached the areas mentioned by infiltration from the neighborhood of the femoral canal.

The hip joint: The head of the femur seems to be almost in place, but on closer examination, after incision of the capsular ligament, is found to be resting with the margin of the articular surface on the posterior-superior brim of the acetabulum. The head, apparently as a result of fibrous adhesions, cannot be replaced within the joint, although no degree of force was used in the attempt. The capsular ligament and ligamentum teres are relaxed. A slight effort at straightening the limb is followed by the immediate displacement of the head of the femur upward and backward. The innominate bone just back of and above the acetabulum is smooth, and seems a little more dense than elsewhere. Realizing that a careful study of the bone and joint at the necropsy would not be possible, the ilium was divided just below the inferior curved line and also through the body and ramus of the pubes near the angle and the femur sectioned just below the trochanter. Recognizing the presence of fractures, great care is necessary in removing the specimen; and force must be avoided, in order to prevent any further alteration in the architecture and relation of the structures to be examined. This specimen was removed to the laboratory and partly dissected by Dr. Aller G. Ellis, who submits the following detailed description:—

The specimen as removed consists of those portions of the right innominate bone and upper extremity of the right femur that include all the structures entering into the formation of the right hip joint. The capsular ligament has been incised along the anterior and superior margin of the acetabulum: it is much thicker posteriorly and externally than below and in front. The acetabulum is slightly flattened, measuring 2.75 cm. in the vertical and 2.25 cm. in the horizontal axis. The greatest depth of the cavity proper is 0.7 cm. The ligamentum teres is 5.5 cm. long, 0.4 cm. wide, and 0.2 cm. thick at its middle, expanding at both ends. The acetabular insertion is expanded so that it occupies all of the anterior third of the cavity. In addition to this an extension 0.3 cm. thick spreads over about half of the remaining two-thirds of the floor of the acetabulum. The ileo-femoral ligament is indistinguishable from the capsular, and the cotyloid and transverse ligaments cannot be exposed without undesirable mutilation of the specimen. The head of the femur is slightly flattened antero-posteriorly. There is a lentil-shaped area of flattening of the articular surface that corresponds to the point of attachment of the ligamentum teres. The ligamentum teres is inserted on the upper portion of an almost plane surface that measures 1.75 cm. by 1.5 cm. This flattened surface corresponds to a similar area on the posterior margin of the acetabulum, the latter area being formed partly of the bony wall of the acetabular cavity and partly by compressed ligamentous tissue.

There is an intracapsular fracture of the neck of the femur. The line of separation passes obliquely across the neck of the bone, and at the upper border almost reaches the juxta-epiphyseal line of the head. At the lower border it is 1.5 cm. from that line. The periosteum for some distance on either side of the line of fracture has been separated from the bone by subperiosteal hemorrhage. There is a fracture of the ischium extending through the body of that bone in an almost horizontal plane. The highest point of the line of separation is external, where it is approximately 0.5 cm. below the acetabular margin. Subperiosteal hemorrhage is present around this

fracture. There is also a second fracture of the ischium passing transversely through the ascending ramus at a point 0.8 cm. above the lower boundary of the obturator foramen. No fragment in any of the fractures shows the slightest displacement: there is no perceptible separation, and the slight periosteal hemorrhage is the most conspicuous feature present at the line of separation. The periosteum holds the fragments in accurate apposition.

The left side differs from the right in degree of reposition, but in no essential anatomic character. The hemorrhagic infiltration is very much less, but the distribution in the thigh is practically the same as on the other side. There are a few loculi similar to those mentioned as present on the right and distributed along the course of the femoral sheath. The intermuscular and intramuscular suffusion is nothing like so marked as that seen on the opposite side. The head of the femur is scarcely more than raised on the brim of the acetabulum upon which the articular surface rests. The condition of the acetabulum, head of femur, and ligaments, seems the same as on the opposite side, and a repetition of the description does not seem necessary. There is no noteworthy difference between the periarticular structures on the two sides, except that on the left fibrous adhesions are more conspicuous and the head of the bone seems more firmly anchored. This difference is probably due to less thorough dissolution of adhesions possibly originally equally firm on the two sides. No fractures are present on the left side. After section of the almost unresisting muscles it was found almost impossible to place the head of the femur in the acetabulum, although the capsular ligament is opened anteriorly and two fingers placed in the joint as aids to reposition. The resistance to restitution to position seems to be great thickening and dense fibrous adhesions posteriorly, as on the other side the bulky ligamentum teres occupies the cavity of the acetabulum. No specimen from this side was preserved.

Permission to examine the central nervous system was not obtained.

Bacteriology.—Inoculations on agar and into bouillon were made from the areas of hemorrhagic infiltration and loculi of blood in the thighs, also from the pleuras, pericardium, blood of the heart, spleen, and liver; but no growths were observed. Tubercle bacilli, as already noted, are present in many of the lymph-nodes; and an organism believed to be the pneumococcus is present in the sections of the lung and peribronchial lymphatics. The last-named organism not infrequently fails to develop in cultures made from tissues in which it can be demonstrated by staining methods.

III.

THE FORCIBLE REPOSITION OF CONGENITAL LUXATION OF THE HIP.

GWILYM G. DAVIS, OF PHILADELPHIA.

The attempts at forcible reposition of congenitally luxated hips have given rise to so many accidental traumatisms that the question has arisen as to whether, in order to avoid bringing the treatment into disrepute, it is not appropriate to advocate more conservative measures.

That it is both desirable and proper to use a certain amount of force in this as in other orthopedic measures is self-evident, and its employment in the reduction of congenital luxations is just as necessary as it is in traumatic ones and, rarely perhaps, even with the greatest care, a femur may be fractured; but the question is, Has not the use of force been carried too far?

When Paci was evolving his method of forcible reposition from 1887 to 1894, he was evidently at times employing considerable force, and fully appreciated its dangers. He laid much stress on using the greatest care and slowness in making the reposition, because he stated that fracture of the thigh might otherwise be produced, which accident, he said, had already occurred. When Professor Lorenz, after seeing Paci demonstrate his method of forcible (now sometimes called bloodless) reposition at the time of the International Congress in Rome in 1894, published and demonstrated in 1895, and later his own mode of procedure, it was characterized mainly by the great force advocated. What Paci attempted by comparatively mild and more or less gradual methods Lorenz sought to accomplish by violence. The earlier descriptions and reports of his manipulations showed that such an amount of force was used and so many serious injuries inflicted as to cause me to

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view his modifications of Paci's procedures with distrust, and doubt their necessity. When in 1900 Professor Lorenz issued the second edition of his volume on congenital luxations of the hip, he stated that in 450 cases he had had 3 deaths,—1 was from chloroform narcosis, the other 2 were apparently due to the manipulations, for they occurred sixteen and twenty-four hours later. There were also 11 cases of fracture of the neck of the femur, 1 of the pubic bone, 1 of the ilium, 3 paralyses of the perineal nerve, 7 of the anterior crural, besides some of the sciatic, and 1 total gangrene of the lower extremity. Minor traumatisms, causing stiffness of the joints and the serious ruptures described by Narath, also occurred.

Heusner, of Barmen, has recently stated that he and Hoffa have had even more serious results. Hoffa in the German Congress of 1899 stated that he had had tearing of the soft parts, vulva, urethra, fractures and separation of the epiphyses, paralysis of the sciatic and anterior crural nerves, and suppuration of the hematomas which formed at the site of rupture of the adductors. He even lost one case, a child of six years of age. It may be urged that these injuries occurred early in the development of the method of forcible reposition and in old cases. This is only partly true, because Heusner's article appeared late in 1902 (*Zeitschrift für orthopaedische Chirurgie*); and it is a well-known fact that the most difficult cases are not always the oldest ones,—one of the worst in Philadelphia was only four years of age,—also that these accidents appear to be still recurring, and new instances are being continually brought to light. Wilson and Dinkelspiel state that in one of the cases operated on by Professor Lorenz himself in Philadelphia the child was seized with convulsions, went into a state of stupor, the pulse became weak and rapid and could not be counted. This child fortunately recovered. Professor Lorenz is quoted as saying of this case that he considered shock and traumatism as the cause of the symptoms. Others who have followed his teachings have not escaped. I have recently heard of two additional deaths and another case of fracture of one thigh and paralysis of the opposite leg in a bilateral

luxation, besides tearing of the perineum and other traumatisms. In order to appreciate what amount of force Professor Lorenz advocates and uses in his manipulations, the four cases operated on in his public clinic in Philadelphia will illustrate. His routine method, as accurately as I can describe it, on that occasion was first to place the child on König's block, and, an assistant holding the pelvis, the thigh was abducted and extended, while pressure was made on the adductors near the symphysis until they were ruptured. The leg was then extended on the thigh and the thigh forcibly flexed on the abdomen until the heel laid alongside of the ear. Then the operator or his assistant made traction while the other held the pelvis. The child was then replaced on the block, and forced abduction and hyper-extension performed with the thigh at right angles to the body and the leg flexed on the thigh, the internal condyle pointing anteriorly and the toes laterally outward. This position I would call external rotation. These manipulations were repeated until the head moved to its new position. In the last case, after performing these manipulations in a child aged four years, and not succeeding, six times was extension made by assistants pulling on a skein of yarn attached above the ankle, while counter-extension was accomplished by a sheet fastened to one corner of the table, the perineum being protected by a rubber pad. On one occasion there were three assistants pulling, the operator was pushing on the trochanter, another assistant helped to steady the pelvis, another gave the anæsthetic, and three were holding the table,—a force of eight powerful men (exclusive of the anæsthetist) who were exerting their strength, directly or indirectly, on the tender tissues of a child four years of age. Between the tractions the patient was repeatedly hyper-extended over the block. On the last attempt the head moved slightly forward, and the operator stated that in this case he would be satisfied with a partial result. That the manipulations were not without a certain amount of risk, even to the operator, was shown by the reported sequel of his having sustained a sprain of the wrist as a result of his efforts.

While it is true that many of these severe injuries have occurred in the older cases, they are by no means confined to them. Their frequent occurrence apparently compelled Lorenz to abandon the use of his screw traction, and instrumental traction has been discontinued by nearly all operators. The great increase in the number of accidents and severe injuries following attempts at reduction which has occurred since Professor Lorenz has given public demonstrations in this country justifies a plea for a modification of the methods at present so generally used. Designating as "bloodless" a method that tears the soft tissues, breaks the bones, produces hematomas extending from the middle of the thigh below to the umbilicus above, and at times kills the patient, seems to me to be a trifle facetious, and certainly savors more of sophistry than it does of truth.

When we consider that the deformity is not a fatal one, and that in some it is not even a seriously disabling one, means of treatment which subject the patients to the serious risks of permanent injury or loss of life are not to be recommended.

It therefore becomes a duty to see if the objectionable and dangerous features cannot be eliminated. With this object in view the following suggestions are offered: That the tendons of the adductor muscles at least be cut subcutaneously, and thus considerable traumatism and mauling of the soft tissues at this point be avoided. It appears to me to be unnecessary to resort to violent stretching movements in all directions, as a routine practice to loosen up the joint. It is a serious question as to whether by rendering the joint loose and flail-like they do not increase the functional disability and favor the tendency to displacement. In many cases, particularly the younger ones, replacement can be accomplished, as has been my experience, without such extensive tearing and stretchings. Violent tractions for immediate replacement, I believe, should be totally abandoned. Everything that can be gained by violent traction can be gained without risk by weight traction, with the patient confined to bed for a variable period of time. This has been demonstrated by Pravaz, Volkmann, Brown,

Mikulicz, and others. Lorenz* characterized his own method as a traction method and Paci's as a circumduction method; and he was right, but it is the latter which is the correct one. Forcible traction has no place in the immediate reduction of congenitally luxated hips. It is the agent which is mainly responsible for the traumatisms which are inflicted; and, if we are to avoid them, we must adhere more closely to the original teachings of Paci, which, as he stated, consisted simply in the application of the circumduction method of reducing traumatic luxations. In this the thigh is flexed on the abdomen, followed by downward pressure on the knee with abduction, external rotation, and gradual extension. Pressure is made on the trochanter posteriorly while the limb is carefully extended. Abduction is afterward maintained to an extent sufficient to prevent the head from escaping from its new position. Whether the thigh is completely flexed on the abdomen or only at right angles to the body, I think, is immaterial, but prefer the former. If the adductor muscles prevent the desired abduction, they can be tenotomized. This is not always necessary.

To make the pressure on the trochanter, it can be done with the hand beneath or rested on a hard roll, as did Pravaz; the edge of the table, as did Paci; or König's block, as does Lorenz. If serious difficulty is experienced in attempting reduction, then, instead of resorting to increased force, I believe it better to confine the patient to bed with the limb abducted and with weight extension, if desired, for two to eight weeks or even longer, and then again attempt reduction. The loss of time occasioned to these children is insignificant compared with the importance of avoiding the dangers of violence.

Rather than resort to the great force now at times employed, I believe it to be much better to incise and clear a way for the head of the bone.

* *Revue d'Orthopædie*, 1897, p. 143.

IV.

CASES OF CONGENITAL DISLOCATION OF THE HIP.

GEORGE B. PACKARD, M.D.

The following cases of congenital dislocation of the hip were operated upon by Professor Lorenz in Denver, Oct. 28, 1902. Most of the cases have been under my observation since that time.

Case 1.—A. R., female, aged five. The dislocation was upward and backward, the top of trochanter being 1½ inches above Nélaton's line. The reduction was accomplished by the usual manipulation. The spica was applied, and the child began to walk in about one week. Dr. Lorenz remarked at the time that the stability was poor. I removed the dressing six months after its application, and reapplied the spica. As far as I could judge, the head of the bone was in the anterior position. An X-ray picture was taken, by mistake, after the plaster was reapplied. I think, however, after a careful study of the picture it shows the head of the bone below the anterior superior spine.

Case 2.—C. H., female, aged six, was treated for one year by a brace which prevented weight-bearing. The dislocation was posterior, and reduced with considerable difficulty. Fear of fracturing the bone was referred to by Professor Lorenz from the fact that the leg had been deprived of functional use during the preceding year. The stability, however, was reported good. About six months from the time of operation I removed the dressing, and the head of the bone seemed to be in position. An X-ray picture was taken, and I think it shows without any doubt the head of the bone in the proper position.

Case 3.—E. R., female, aged five. Posterior dislocation with one inch shortening. Reduction was accomplished comparatively easy, and the stability reported good. May 3, 1903, the first spica was removed, joint examined, and an X-ray picture taken which shows the head in position.

Case 4.—J. M., male, aged five. Posterior dislocation, motion somewhat restricted. Reduction took place with a good deal

of difficulty, but stability was pronounced good. A singular fact in regard to this case is that he has two brothers afflicted with the same deformity, one of them being double. A skiograph shows the head a little above the acetabulum.

Case 5.—J. M., female, aged five. This case presented the usual symptoms of posterior dislocation, and was reduced with very little force. The acetabulum was evidently very shallow, and with very slight motion dislocation would reoccur. The spica was applied, and the patient has been walking since. The child lives in Wyoming, and has not returned for further dressings. I cannot therefore report on her present condition.

Case 6.—J. T., female, aged nine. Reduction was attempted in this case notwithstanding the age, although the opinion was expressed at the time by Professor Lorenz that the result was very uncertain. After a great deal of force was used, particularly in extension, abduction was attempted. This resulted in tearing the skin and subcutaneous tissues in the perinæum to such an extent that the operation was abandoned. The spica was applied with the leg in an abducted position. I have not seen this case since the operation.

Sufficient time has not elapsed since the operations to determine the ultimate results in these cases, but the present indications are that Cases 2 and 3 will result in recovery and that Cases 1 and 4 will be displaced forward and upward. I cannot make any report on the present conditions of Cases 5 and 6.

V.

PERIPHERAL PALSIES FOLLOWING MANUAL REPLACEMENT OF THE CONGENITALLY DISLOCATED HIP.

HENRY LING TAYLOR, M.D., NEW YORK.

Among Professor Lorenz's most admirable qualities are his readiness to answer pertinent questions and his frankness in relating the difficulties and dangers incident to manual replacement of the congenitally dislocated femoral head. Perhaps the chief danger connected with this procedure is that its seeming simplicity in the hands of a master may cause those less experienced to underestimate the skill necessary to success and to ignore the complications to which it is liable.

In observing the cases operated on by this method in several New York hospitals in the last few months, the writer has been struck with the slowness with which some of the patients learned to walk. On investigation it was found that the quadriceps muscle in several cases was completely paralyzed. With the patient seated and the leg hanging, there was no power to extend the knee, while the knee flexors and foot muscles showed normal activity. The anterior crural nerve had evidently been injured by the manipulations. In applying the test, care should be taken to see that the patient does not first flex the knee and then allow it to swing forward by its momentum or from movements of the body. The quadriceps cannot be properly tested in the recumbent position, since the leg may be advanced by movements of the foot against a horizontal surface. In some cases passive extension was somewhat limited by contraction of the hamstrings, but this did not interfere with extension of the pendent leg.

My attention having been called to this complication, cases were examined, by the courtesy of Professor Gibney, Professor Plimpton, and Professor Townsend, as occasion offered; and

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nine instances of quadriceps paralysis, one of peroneus palsy, and one of sciatic were discovered among the cases operated on in December or later. Of the quadriceps palsies three were double, making twelve limbs affected.

The ages of the nine patients ranged from two years and a half to eleven years, but only four were over six years: all were girls. The complication was therefore frequent in this group of cases, and it occurred repeatedly in the hands of the most expert operators. The paralysis was in all cases complete when the cases were first examined a month or two after the operation, with the exception of one examined two months later, which was partial at that time. In all the cases but one, which has not recently been seen, the paralysis began to recover during the third or fourth month, and the recovery was either complete or was still progressing at the last examination. The complication seems, therefore, not to be serious, and the prognosis is decidedly good, even without treatment, for none of the cases received any for the paralysis. It should, however, be recognized as a common cause of delayed walking after reposition.

In addition to these cases of quadriceps paralysis I have observed two cases of foot-drop following the operation, without involvement of the quadriceps. In a girl of ten years of age there was a complete paralysis of the anterior leg muscles, with foot-drop, apparently due to stretching of the peroneal nerve: this patient is now recovering. In a thirteen-year-old girl all the muscles below the knee, both front and back, were paralyzed; and three months after the operation there was evidence of but a faint trace of returning power. The palsy in this case was undoubtedly due to a stretching or rupture of the sciatic above its bifurcation. These peroneal and sciatic palsies are more serious than the crural; and, if due to rupture of the nerve, they may be permanent. Both cases observed were considerably beyond the age and limit, and in one reposition was not accomplished.

Professor Lorenz, in his monograph on the treatment of Congenital Hip Dislocation, published in 1900, reports five cases

No.	Age.	Side.	Date of Operation.	Date of Examination.	Quadriceps Palsy.	Results.
			1902.	1903.		
1	6	R	Dec. 15	Feb. 18	Partial	
2	6	D	Dec. 16	Feb. 25	Total both	March 18, slight power left; April 3, slight power, right; April 24, good power both.
3	10	D	Dec. 16	March 18	Total both	April 22, slight power both.
4	5	R	Dec. 17	Feb. 22	Total	May 7, still on crutches; can extend knee.
5	8	L	Dec. 17	Jan. 23	Total	
6	$2\frac{1}{2}$	D	Dec. 17	March 30	Total both	May 7, can extend knees somewhat.
7	11	R	Jan. 14	Feb. 18	Total	May 7, complete recovery.
8	9		Jan. 15	Feb. 18	Total	May 7, recovery.
9	4		Feb. 13	March 28	Total right	April 18, slight power.
10	10		Dec. 17	Feb. 18	Palsy peroneus nerve; drop-foot	April 30, nearly complete recovery.
11	13	D	Feb. 18	March 10	Complete palsy right sciatic; no power below knee	May 8, very slight motion at ankle.

of quadriceps and three of sciatic paralysis out of some four hundred replacements: all of the former recovered. My observations agree in all respects with those above recorded, except that in the series here reported the paralysis is more frequent, having occurred in a group of less than fifty cases, and is by no means confined to the older cases. It should be remembered, however, that a quadriceps palsy might easily escape notice, and the child's difficulty in walking be attributed to the awkwardness of the posture.

The conclusion is obvious from the frequency of this complication and from the liability to more serious accidents that the manipulations should be deliberate and careful, and that, when serious obstacles to reposition exist, the attempt to reduce the dislocation by manual force alone should be abandoned.

DISCUSSION.

Dr. Roswell Park, of Buffalo, was invited to open the discussion. He said he had listened to the papers with great interest, and had been impressed with the folly of calling this a "bloodless" method. He believed that often more blood was shed and more harm was done than by the combination such as had been suggested by Dr. Bradford. He did not think it was safe to break bones and tear tissues so indiscriminately as had been done in the employment of this method.

Professor Tiffany, of Baltimore, was invited to speak. He said that he appreciated the honor very much, but had been unable to attend the meeting until near the close of Dr. Bradford's paper.

Dr. James E. Moore, of Minneapolis, was also called upon. He said that he had only come into the meeting to learn, and had not expected to speak, and yet he was glad to have the opportunity, because, with all honor to the method and to those who had brought it to a wonderful state of perfection, he felt that there were certain attendant dangers which had been briefly touched upon by Dr. Park. He had not had the pleasure of seeing Lorenz operate, although he had seen a good deal of him in connection with the meeting of the American Medical Association. From time immemorial it had been customary to reduce recent dislocations by mechanical manipulation, and wonderful skill had been developed along those lines; but in all this time there had been some cases in which the surgeon had been unable to make a reduction. In pre-antiseptic days those cases were left untreated; but, since we had learned that the tissues could be safely opened up, we had not hesitated to operate upon them and reduce these complicated dislocations. While it seemed perfectly rational that those skilled in the use of this method under discussion should resort to it, it also seemed rational to believe that there were a certain number of cases in which operative treatment would offer better chances to the patient. He thought the profession was liable to fly off at a tangent in this instance, as, unfortunately, in many others in times gone by,—unfortunately, one of our great weaknesses. The method touched a chord of sympathy among the laity, for they disliked the idea of the shedding of blood; but, as Dr. Park had remarked, this operation often caused a much greater loss of blood than a clean-cutting operation in the hands of the expert surgeon. He was satisfied that finally, when the experience of all surgeons had reached perfection, there would still be some cases demanding a clean, open incision.

Dr. V. P. Gibney said that he had not as yet tabulated the cases operated upon at the hospital, having waited for the five or six months to

roll by. He quite agreed, however, with many of the remarks made to the effect that the operation was one fraught with a good deal of danger; and, while many of us believed that a child of four years with congenital dislocation of the hip offered an easy case for reduction, he must dissent somewhat even from this opinion. The whole subject had been well treated by Dr. Bradford. He hoped to be able to present some statistics when the papers were published.

Dr. N. M. Shaffer said he had listened with a great deal of interest to all that had been said, and he wished to express his great appreciation of Lorenz's visit and his efforts in this country; for he felt that orthopedic surgery had been immensely benefited thereby. Dr. Lorenz had operated at his clinic in New York; and in every case before operating he had asked if we were all ready for operation,—in other words, he was prepared to operate if a cutting operation seemed indicated. Hence he was not always a bloodless surgeon. He did not regard the operation as a brutal one any more than osteoclasis; and he regretted very much the inability of Lorenz to be here at this time and participate in the discussion, as had been expected. He wished to express his great appreciation not only of Lorenz's visit, but of his high scientific attainments.

Dr. George B. Packard exhibited some X-ray pictures of the cases operated upon in Denver by Lorenz. Six cases were operated upon, and four returned later, and X-ray photographs were taken. In one of the other two the stability was very poor. In the other case, a child of nine years, the bloodless operation had been attempted; but, the skin and subcutaneous tissues tearing, the operation was abandoned, and the limb was put up in an abducted position. Two of the four skiagraphs showed the hip to be in perfect position: the other two skiagraphs showed anterior transpositions.

Dr. J. Ridlon said he had seen a considerable amount of the work done by Lorenz in Chicago, and he wished to say that he was a thorough believer that this was the best operation. He had notes, though not final ones, of 21 cases upon which Lorenz operated, and on 26 cases that he refused to operate upon, making 47 altogether. Of the cases operated upon, in 4 instances he failed to replace the hip, in 1 instance he fractured the neck of the femur, and in 1 instance the shaft of the femur, making 6 cases in which replacement was not obtained. In one of these cases, but not in the case of fracture, paralysis of the sciatic group resulted, and had not yet entirely disappeared. In one instance in which replacement was effected, the perinæum was torn. Dr. Ridlon said he had uncovered four hips upon which Lorenz had operated. The

first was a child of four. The hip was found in anterior transposition, and the joint firm. In the next case, a bilateral one, one hip was either in the socket or very slightly in front of it; the other hip in that child was the one in which fracture of the neck of the femur occurred, and the head of the femur could be felt lying on a level with the greater trochanter, and to the posterior and upper side of it. This gave a total of 10 cases in which the final results were known out of the 21 operated upon by Lorenz. All of the cases would be reported upon in detail at a later time. Of the cases not seen, but heard from, there were three. One was said to be in good position; one was said to be an anterior position, with the head beneath the femoral artery and nerve; in a third case Dr. T. A. Davis, of Chicago, reported that, when the plaster splint was removed, the head of the femur at once slipped out of the position in which Lorenz had placed it, but was easily replaced in the same position.

Dr. B. E. McKensie thought it was unfortunate that the laity, and too largely the profession, discussed this question as if Professor Lorenz had claimed to present a perfected operation. He agreed with those who said that Lorenz took no such stand, but presented his claims in a very unostentatious and modest manner. When asked, at the Hospital for Ruptured and Crippled, what results he thought he was obtaining, he replied that, when there was a double congenital dislocation, he thought a successful result should be obtained by him in 25 per cent., and, when there was only one hip affected, he should obtain a successful result in 50 per cent. of the cases. This seemed to be entirely at variance with what was believed in general by the laity and very largely by the profession. Lorenz seemed to realize that he was encountering still very serious and unsolved problems. Some of the papers described Lorenz as a man of Herculean strength, and stated that he manifested this when operating upon his cases; but Dr. Wilson had called attention to the fact that very frequently it had not been found necessary to make use of much force when one became experienced in the necessary manipulations. The speaker said he had seen Lorenz operate, and had not observed the use by him of any great amount of force. It was unfortunate, therefore, to allow these statements to go forth regarding the amount of force which Lorenz used.

Dr. Arthur J. Gillette said that orthopedic surgeons realized, but the laity and many of the medical profession did not, that congenital dislocation of the hip did not necessarily render the patient a hopeless cripple, if left alone. Many of these persons did well after a time, if untreated. This fact should not be forgotten.

Dr. Leonard W. Ely, of New York, said he had listened with great interest to this discussion. The accidents, occurring as they did in the practice of men of known skill, showed conclusively that the operation was not one free from danger. The practical unanimity of opinion among orthopedic surgeons that this condition gave rise to much disability and that something should be done, was worthy of note, as also the fact that this operation seemed to be the best yet devised.

Dr. De Forest Willard, of Philadelphia, said he had performed the forcible reduction operation for several years before Lorenz's visit with indifferent results, but since then he had been using more force, and had succeeded better in reducing the dislocations. Both the clinical examination and the skiagraphs, however, had shown in every case not only a defective acetabulum, but a distorted head and a malformed neck. He felt sure, therefore, that a considerable number of these cases would relapse within a year after the child began to walk. The term "bloodless" should not be applied to this operation, for a torn muscle bleeds far worse than does a clean incision with a tenotome. In the three of the last twelve cases he had divided the adductors. He thanked Dr. Bradford very much for the point with regard to the resistance offered by the adductor magnus, for previously he had been of the opinion that the resistance came from the adductor longus. With regard to the apparatus described by Bradford he would say that he could not believe that a mechanical device of this kind was as safe as the use of the hands. The perfected operation will consist of division of the muscles in addition to manipulative procedures. It was true that many persons with congenital dislocation grew up and became strong and vigorous, yet they suffered from lordosis and walked badly. He was inclined to think that, when a femur has been lying for ten or twelve years on the dorsum of the ilium, it would do more harm to transpose it into the anterior position than to leave it alone. At the present time he would be disinclined to throw the head forward in a case over eight years of age.

Dr. A. J. Steele said that many of the cases operated upon by Lorenz had been under his observation only for a few years. Dr. Dexter D. Ashley, who had been with Lorenz, told him that not infrequently Lorenz applied traction for a long time. Reference was made to the case of a strong child of seven years upon whom Lorenz had refused to operate. Subsequently by long traction and division of the adductors, and by the use of screw power before operation, it had been found possible to reduce both hips.

Dr. Dexter D. Ashley, of New York, was invited to speak. He said that he did not feel that he could speak for Lorenz, although he had listened with much pleasure to the discussion. He had 52 cases under his own observation, and hoped to be able to publish the results at some future time.

Sir William Hingston said that the discussion to which he had listened amply repaid him for the trouble of coming from near the north pole to this centre of American science. He had never listened to a discussion anywhere characterized by more fairness, clearness, and impartiality, whatever the daily press might say to the contrary. Dr. Lorenz was not upon his trial: it was his method which was being subjected to scrutiny. The examination of the subject should certainly be impartial as regards the surgeon, but it was chiefly in the interests of the little patient. The dangers on the one side and the advantages on the other side should be carefully considered by the slow process of analysis of cases, and later by synthesis and groupings. It is fortunate for the sufferers all over the world that Dr. Lorenz had come to America; for the subject had been and will be approached without prejudice and previously conceived notions, and in a short time no doubt the whole question will be presented for the consideration of surgeons generally.

Dr. Starr spoke of the ligamentum teres, which we had been inclined to think was absent in these cases, and called attention to a case in which that had proved an obstacle to reduction.

Dr. Kurtz said there was still an obstruction not yet mentioned; *i.e.*, the elongated capsule. It was occasionally a decided obstacle in the reduction. Lorenz overcame this by long-continued abduction and adduction.

Dr. G. G. Davis, in closing, said that the object of his paper was to call attention to the fact that accidents had occurred. At the time he did not know that these other papers were to be presented, but they served to substantiate what he had said. He did not think enough stress had been laid upon the use of continuous traction, although Dr. Steele had alluded to it. His views regarding the operation not being bloodless had also been confirmed in the course of the discussion. Ultimately, some of these cases would be treated by a cutting operation.

Dr. H. A. Wilson said he felt that the very greatest and the highest tribute that would be paid to Lorenz and his visit to America was the fact that there would be very soon an entire disappearance of all cases of irreducible congenital dislocation of the hip beyond six or seven years

of age. The result of his visit and the notoriety in the secular and medical press had been of much benefit in calling the attention of the general practitioner to these conditions; and, therefore, many of these cases would, in the future, be reduced at the time when this could be properly done.

Dr. E. H. Bradford said with regard to the obstacle offered by the ligamentum teres that he thought this had not been very thoroughly worked out. He had found the ligamentum teres present not infrequently in very young children with congenital dislocation, although it was usually absent in the older cases. With regard to the folding in of the capsule, he would say that some years ago he had shown a specimen in which this was present, and had then stated his belief that this was the chief obstacle to reduction. He was now inclined to think that he had exaggerated the frequency and importance of the obstacle thus presented to reduction. He hoped the members of this Association would discourage the idea, apparently entertained by some members of the profession, that every case having anything the matter with the hip was to be treated by forcible manipulation. The so-called Lorenz method was not a trifling procedure, even in a small child, and should only be undertaken when the diagnosis is certain.

VI.

A CASE OF SPASTIC PARALYSIS TREATED BY TRANSPOSITION OF HAMSTRING TENDONS. ALSO A CASE OF CONTRACTURE OF HAMSTRING MUSCLES OF SPASTIC ORIGIN RELIEVED BY ELONGATION OF HAMSTRING TENDONS.

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The subject of the first clinical report, a boy eleven years old, came under my care in June, 1902, for the treatment of congenital spastic diplegia. The history showed premature birth at the seventh month. Forceps delivery was employed to accelerate parturition, because the two preceding labors had been protracted and the infants were born dead. The patient is the third oldest of eleven children, all but one other of whom were born prematurely and lived but a short time, or were still-born at term. The parents are healthy, vigorous farming people. One sister, aged seven years, is living, and healthy.

Spasticity was first noticed when the patient was about four months old, being general in distribution. Physical growth was much delayed until the fourth or fifth year. Mental development, speech, etc., were backward, and enfeeblement of mind marked. Improvement in the foregoing conditions was not especially manifested until the sixth or seventh year. Spasticity was not associated at any time with athetosis. In the upper extremities and body the muscle spasm diminished slowly after the seventh year. This was replaced by a moderate regeneration of muscular power, sufficient to enable the patient to sustain the sitting posture and to move about by dragging the body along the floor. The standing position could be sustained only by holding on to fixed objects, the malposture of the limbs and muscle spasm making it a very strenuous effort. (Fig. 1.) The greatest amount of spasticity and contracture

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existed in the hamstring groups. These had become adaptively shortened, so that the legs could not be extended to within forty-five degrees of the straight position. The flexors and adductors of the thighs and the posterior leg groups contributed

FIG. 1. Congenital Spastic Diplegia (Little's Disease). Appearance previous to transposition of the hamstring tendons to quadriceps femoris—June, 1902.

to maintain the limbs in the characteristic flexed and crossed attitudes and equino-varus postures of the feet. (Fig. 1.) Exaggerated reflexes were present in all spastic groups. In the antagonistic groups there was diminished electrical reaction, being especially weak in the quadriceps. The quadriceps also

evinced no contraction during the attempt to perform extension of the legs. The palsied condition of these muscles seemed in large degree the effect of their long-continued maintenance in a stretched and disused state, from the spasm and contracture in the hamstrings. The general palsy and spasticity was regarded as belonging to the type distinguished clinically as Little's disease, and depending on uncompleted development associated with premature birth. Trauma from instrumental delivery probably contributed in no important degree to the nervous disorder. The labor was not prolonged, and the small size of the child undoubtedly made its extraction easy of accomplishment.

Operative indications in this case pointed chiefly to the relief of spasticity and contracture in the leg flexors. Relief of tension in these groups was expected also to modify spasm in other groups, which had not undergone contracture. Simple elongation of the hamstrings was deemed inadvisable, on account of the lowered muscular tone in the quadriceps. As the chief disturbing influence in performing locomotion existed in the hamstring groups, it seemed appropriate, when releasing them from their constrained relations, to place them in positions to be of greatest value for the purposes of locomotion; namely, by attaching them to the weakened extensors. This seemed especially indicated in view of their well-developed, vigorous condition. Dependence could be placed on the gastrocnemii for supplying flexion power such as would meet the requirements of function under these circumstances.

With this plan in view, the semitendinosus, semimembranosus, and gracilis were separated at their tendinous insertions to as full an extent as possible. The three tendons were interwoven into one cord, and passed upward and forward through a tunnel under the fascia lata, and through buttonholes in the expansion of the vastus internus, and anchored to its aponeurosis, as near the patellar tendon as possible. The tendon of the biceps was similarly detached and fastened to the aponeurosis of the vastus externus. After a protective had been applied over the operation field, the limb was encased in a

plaster-of-Paris splint from ankle to groin, to maintain it in the straight position.

The operation on the second limb was made two weeks later,

FIGS. 2, 3. Same patient, twelve weeks after transposition of hamstrings to quadriceps, showing correction of deformity in knees and relief of spasticity in associated muscle groups.

and was similar to the first in all its details. Releasing the hamstrings from their tense relations to the legs was quickly fol-

lowed by relief of spasticity in the thigh flexors, adductors, and leg groups. All malposture in the lower limbs was therefore relieved by operating on the hamstring groups only. (Figs. 2, 3.)

FIG. 3. (See Fig. 2.)

Following the operation, no movement at the knees was allowed for eight weeks. The splints were then removed, and the patient permitted to sit up. Massage and faradism of the thigh and leg muscles was employed daily, and the patient encouraged to practise flexion and extension movements. He

was also assisted into the standing position, supporting his weight on the limbs for short periods frequently during the day. Advantage was taken of any fixed object conveniently situated, to support himself for a time in the standing position. At the end of ten weeks from the second operation, he was able to stand, lightly supported by the hands of a nurse. (Figs. 2, 3.) Four weeks later he could walk the circumference of the hospital ward, holding on to beds, etc. Evidence of increasing power to extend the legs was apparent from time to time. At the end of four months, when he left the hospital, extension of about fifteen degrees could be definitely, though feebly, executed. The gastrocnemius supplied all the demands of a flexor muscle.

The patient was not again seen by the writer for six months. At that time (April, 1903) his condition as regards locomotion and general vigor indicated continuous improvement during that interval. He was able to stand easily by steadying himself with a cane or crutch. With the aid of crutches he could walk three-fourths of a mile. (Fig. 4.) The increase of power in the quadriceps was very marked, the patient while sitting being able to extend the legs to about sixty degrees. (Fig. 5.) Extension could not be made separately in each leg, when sitting, the associated action of the muscles of the other limb seemingly being the chief obstacle. The extension of the legs during locomotion is still feeble, and accompanied by a swinging movement of the limb; but there is the suggestion of steady improvement of muscular control.

Not the least interesting feature of this case has been the rapid improvement of the patient's mental faculties. This began to be apparent shortly after the division of the spastic muscles, manifesting itself first by marked decrease of the nervous excitability that had been a constant accompaniment of the spasticity.

This form of relief is often experienced following division of spastic and contractured muscles, and especially when these are flexor muscles. It suggests that the central excitement is, in part, a reflex of the continued muscle spasm. In those cases

which present less promising features, where only temporary relief of spasm would be expected from tendon division, it would appear that more prolonged benefit might be obtained

FIG. 4. Same patient, nine months after operation. With the aid of crutches the patient could walk three-fourths of a mile.

by transposition of spastic flexors than by division for elongation purposes only. The opportunity afforded for associated

spasticity during attempted evolutions would not produce as much malposture if the legs were in this manner maintained in a position of better extension.

Mental development in this patient became especially active

FIG. 5. Same patient, showing the extension power developed in the quadriceps, nine months after operation.

in connection with his efforts to perform locomotion. Even the facial expression, which indicated the feebleness of mind, soon changed to one of fair intelligence. (Figs. 3, 4, 5.) In conversation the patient now expresses himself well on matters within the range of his educational opportunities. It is fair to assume that the limits of improvement have not yet been reached in this patient. The growth of body and mind and

increase of functional vigor incident to performing even the present limited locomotion are factors on which expectation of further development and control may be built.

In interesting contrast with this case is another of the same type, to which I will briefly allude. The main interest attaches to the different rate of development and the mode of treatment which was adopted. The patient, a boy fifteen years old, was born at term, an undeveloped child, weighing a little less than four pounds. Rigidity of the limbs was observed between three and four months after birth, and soon developed the characteristics of spastic diplegia. Muscle rigidities, which were especially marked as late as the sixth or seventh year, gradually diminished after that age, and were succeeded by muscular development of good quality. (Fig. 6.) The lower extremities retained spasticity in greater degree and for a longer period than the arms and body. But, even in the lower limbs, this gradually gave way to control, incident to growth and development, leaving only traces of the earlier spastic action and shortening in those muscles which had been affected in the highest degree. Flexors and extensors were well balanced; and, barring moderate spastic action and contracture of the hamstring groups, there was but slight noticeable defect. The shortened condition of the hamstring muscles maintained a bent-knee posture of twenty degrees (Fig. 6), which caused awkwardness of gait and fatigue from only moderate efforts in standing and walking. Incidental to the efforts of locomotion, spasticity was excited in muscles ordinarily free from it, when the patient became fatigued. The shortening in the hamstring muscles was structural and adaptive, due to the long-maintained spastic attitudes during the earlier years of the disturbance. Relief in slight degree had been afforded by tenotomy of the Achilles tendons, performed at the age of six years; but no other tendons were divided. For the improvement of locomotion, etc., the muscular conditions suggested only elongation of the hamstring tendons. This was done by the open method, within the tendon sheaths, in the following manner:—

The tendinous bands which converge as they are about to leave the body of the muscle, to form the tendon proper, were divided near the muscle, in the direction of its circumference. In the biceps and semimembranosus, after doing this, a core of

FIG. 6. Residual hamstring contracture, from Little's Disease. Patient 15 years of age.

FIG. 7. Residual hamstring contracture, from Little's Disease. Relieved by elongation of hamstring tendons. Appearance five months after operation.

muscular fibres remains, continuing for some distance into the tendons, some of the fibres of the short head of the biceps reaching even to the insertion of the tendon. These muscular fibres preserve the continuity of the muscle with its tendon insertion

after division of the tendinous bands, so that complete separation does not occur while repair is taking place. This permits of limited but accurate elongation of the tendons, and, in addition, these muscular fibres may be stretched without causing them to separate from the tendon if the division of the tendinous portion does not give sufficient length. The semitendinosus tendon was elongated by splitting. The iliotibial band was also very resistant and short, and required free division. Elongation in this manner gave perfect functional action of the flexors as soon as repair was well established. Improvement in posture and gait was quickly manifested, and the signs of previous spasticity have since diminished in a large measure. A comparison of the posture before operation (Fig. 6) with that shown in Fig. 7, about three months afterward, quite accurately illustrates this feature of the improvement.

VII.

SLIPPING OR RECURRENT DISLOCATION OF THE PATELLA: WITH THE REPORT OF ELEVEN CASES.

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The above condition is seen almost entirely in girls or women, and is due, in large part, to the fact that the line of pull of the quadriceps extensor muscle is not straight, this feature being increased in its effect by an unnaturally long patella tendon, knock-knee, or an imperfectly developed articular surface at the end of the femur. Eleven cases of this condition, seven operative with thirteen operations and four non-operative, have been seen and treated by the writer; and the observations made in connection with the treatment of these cases represents the basis of this paper.

The first feature, or the indirect muscle pull, is in part normal anatomically. The tubercle of the tibia with the attachment of the patella tendon is distinctly to the outside of the central portion of the patella, when the knee is extended and the muscles are at rest. As the action of the muscles together with the joint motion is studied, it is seen that during flexion the patella is drawn forward over the articular surface between the condyles of the femur, and inclines slightly, but distinctly, to the outside of the median line. As extension takes place, the patella ascends, inclining slightly toward the inner side until, when extension is complete, the line formed by the origin of the rectus femoris, the centre of the patella, and the tubercle of the tibia makes an obtuse angle. As the muscle contracts, the natural tendency is to straighten this line, with the necessary result that the patella is drawn outward, representing, as it does, the only movable point in the line. This can easily be demonstrated in any normal joint, if the knee be fully extended and the quadriceps muscle be alternately contracted and relaxed.

The lateral movement of the patella is distinct, the limit outwardly being controlled in part by the ligaments, but more particularly by the outer ridge of the trochlea surface of the femur, which is distinctly higher in its upper and anterior sur-

FIG. 1. (Gray)

face than the same ridge at the inner side. Against this the patella impinges, and displacement further is impossible, as long as all the parts are normal.

If for any reason the line of pull becomes less direct or the articular ridge less perfectly formed; if the capsule be weakened by the distension following some acute injury; if the patella

tendon be abnormally long, so that the patella is drawn above the outer edge of the trochlea surface of the femur, or if the joint can be hyperextended so that during the muscular pull the patella is lifted away from the femur,—in either of these conditions the stability of the joint, so far as the patella is concerned, must be materially lessened.

The displacement of the patella which results from such a mechanical condition may occur frequently with simple motion or muscular contraction, or may develop only when attended

FIG. 2. (Gray)

with the application of considerable force and when combined with some lateral strain, the ease or difficulty of the displacement depending, of course, upon the degree to which the normal condition has been modified. In the extreme conditions the displacement may become permanent, in which case the inner portion of the capsule becomes permanently stretched, while the outer portion shortens. In this condition the patella rests upon the outer surface of the outer condyle of the femur; and complete extension, which depends upon the pull of the quadriceps extensor, acting through the patella over the lower and anterior surface of the femur, is impossible. If this extreme or permanent condition occur in childhood or before the bone growth is complete, the condyles of the femur conform in their

development to the range of motion, so that ultimately complete extension of the joint is impossible, the limitation not being due to ligamentous or tendinous contracture, but to a change in the articular planes. These extreme features were present in Case 1.

It is also true that, if the displacement persist for any length of time in the growing child, a twist in the upper end of the tibia results, so that, even though the patella be replaced, the angle in the pull of the muscle is so much increased that displacement occurs as soon as the muscle contracts.

From my observations in this limited number of cases it seems to be true that, if the patella has slipped out several times without special violence, it is an evidence of joint instability, due to one of the above-mentioned conditions; and, while the slipping may be controlled by simple measures, the weakness usually remains, and the joint is unable to stand the strain of normal use. For this reason, although bandaging, braces for the knees, the correction of flat or pronated feet, should always be tried in the early stages of the trouble before the slipping has become frequent, comparatively little is to be expected in the way of permanency of relief from such measures if the slipping has recurred several times, unless the patient be very young.

The chief point in the treatment naturally consists in the correction of the angle in the line of muscle pull, so far as it is possible. If knock-knee be present, the lateral motion of the patella during use will naturally be increased. If the knock-knee is due simply to the loose internal lateral ligaments, it is conceivable that by thoroughly correcting this the lateral movement of the patella may be lessened and the slipping or dislocation cease. I have not been able to accomplish this in any of the cases here reported, although one seemed favorable as to age, but to expect improvement is reasonable from the study of the mechanics, if the cases can be seen before bone or other permanent changes have taken place.

If marked knock-knee with the usual bone changes be present, this should of course be corrected; but, as this feature was pres-

ent in but one of the cases under discussion, it is probably not as common as has been supposed.

If the patella tendon be long, so that in complete extension the patella is drawn above the outer ridge on the trochlea surface of the femur, it should naturally be shortened, as, unless the normal mechanical relations can be restored, the joint must be unstable. To correct this, the tendon should be shortened; and in doing this it is better, as it lessens the danger of relapse, at the same time to change the attachment of a portion of the tendon, thus making the line of pull more nearly straight. In the one case in which the tendon was simply shortened, relapse occurred, entire relief following the second operation, in which the other half of the tendon was transplanted.

If, after studying the mechanics of the given joint carefully, the relaxed inner half of the capsule is the only defect, this should naturally be tightened. It is my impression, however, that this is almost never the case, and that the relaxed capsule is a result of an abnormal condition rather than the cause, and that, if the cause be corrected, the relaxation of the capsule will take care of itself. In the three operations performed by me, in which only the inner portion of the capsule was tightened, all relapsed; while in the cases which have been operated on since, and the patella tendon reattached, the capsular relaxation has entirely disappeared, although at the time of the operation the capsule itself was entirely ignored.

In the majority of the cases, when carefully studied, it will be seen that the attachment of the patella tendon is distinctly farther to the outside than normal, making less direct the pull of the anterior thigh muscles; and with this the ridge on the outer edge of the articular surface of the femur is less marked than normal.

The treatment which has been most satisfactory in meeting this condition is an operation in which the outer half of the patella tendon is reattached to the tibia well to the inside of the tubercle. In this way the angle in the muscle pull is lessened or entirely removed, so that the patella is drawn firmly across the articular end of the femur and the presence of the ridge at

the outer side is made of less importance. Of the eight operations which have been performed in which this has been the chief feature, in seven no after-trouble has resulted, and the stability of the joints has made them equal to normal use. In one in which the tendon had at the same time been shortened, the first attachment did not remain firm, so that a second operation was necessary.

The operation as carried out at present consists of a longitudinal incision four or five inches long, extending from just below the tubercle of the tibia upwards. Through this the patella tendon is exposed and split in halves, antero-posteriorly, throughout its entire length. The outer half is then cut from its attachment, passed under the remaining portion, and attached to the periosteum, together with the expansion of the tendon of the sartorius muscle at the inner side of the anterior surface of the tibia. If it is desirable to shorten the patella tendon, the attachment can be so made that the patella is drawn down as much as is desirable; but, as this means much tension upon the new attachment, a hole should be drilled in the bone at the point of attachment through which the suture is passed which holds the tendon. The carrying of the free portion under the other is of importance, as in this way the patella is tilted, the outer portion being drawn downwards, and impinges more firmly against the outer ridge of the articular surface of the femur during muscular contraction, so that the danger of displacement is materially lessened.

The attachment is made with strong silk, quilted through the tendon. The wound should be tightly closed, and the leg fixed in a plaster of Paris bandage from the ankle to the groin, the contraction of the quadriceps extensor being eliminated as much as possible by applying a tight gauze bandage from the knee to the groin under the plaster. The fixation should be kept up for about six weeks.

In performing the operation, the inner half of the tendon or that most favorably situated for the direct muscular pull is entirely undisturbed, so that, in case the transplanted portion fails to unite, function is still possible, and some improvement

must still result, as the simple removal of the outer half of the tendon practically moves the existing attachment of the tendon that much farther to the inside.

FIG. 3.

In perfecting the operation, various measures have been tried. The inner half of the tendon in one case was transplanted, with ultimate relapse. The entire tendon was transplanted in one case with a perfect result; but this was not repeated, as the later operation possessed less danger from possible fail-

ure of the new attachment to hold. In one case the patella tendon was simply shortened with subsequent relapse; and in one case the entire tubercle of the tibia was transplanted and nailed to the inner side of the tibia with a good functional result, but with a much longer convalescence than is required in the operation described in detail above. The cases in which simply the inner portion of the capsule was shortened all relapsed.

The cases are reported in detail below. In the operated cases, with possibly one exception, a sufficient length of time has elapsed for a thorough test of the joint to have been given.

Case 1.—This case has been previously reported (*Annals of Surgery*, January, 1899), and represents a case of dislocation of both patellæ in which the malposition had become permanent. The patient was a woman thirty years of age, and was first seen in February, 1895. The trouble with the knee began without injury at ten years of age. Treatment was sought because of pain in the back, which resulted from the peculiar attitude in standing.

On examination both patellæ were on the outer surface of the outer femoral condyles, and replacement was impossible. The tibia was rotated outward considerably, so that the attachment of the patella tendon was much farther to the outside than normal, and complete extension of the knee was impossible, due apparently to the abnormal development of the articular surfaces of the lower end of the femur. On standing, the knees were flexed and braced against each other, increasing considerably the normal lumbar curve, with resulting muscle strain and backache. There was slight knock-knee; and the gait on walking was awkward, one leg being thrown around the other. Horizontal extension of the legs was impossible.

The correction of the position of the patellæ by any manipulation was impossible, so that the patient entered the Carney Hospital, and in March, 1895, the right knee was operated upon as follows:—

Through an 8-inch incision, beginning above the knee on the outside and extending downward across the knee to the inside, the capsule of the joint was exposed. Even with the skin removed, the patella could not be brought up into its normal position, and a longitudinal incision three inches long was made through the outer part of the capsule. After this the dislocation could be corrected without difficulty; but, because of the

change which had taken place in the shape of the ends of the bones, the tubercle of the tibia was so much farther to the outside than normal that, when the joint was flexed, the patella slipped out of place again. In order to obviate this and to have the attachment of the patella tendon in the proper place, the tendon was cut off and sewed to the periosteum and the expanded tendon of the sartorius on the inner and anterior surface of the tibia. The loose capsule on the inner side of the joint was next shortened with quilted sutures; and, for fear that the strong thigh muscles should tear away the new attachment before it should become firm, about three-fourths of the quadriceps extensor was divided just above the patella. The wound was then tightly closed, the skin being depended upon to close the gap (three-quarters of an inch broad) in the outer part of the joint capsule, made necessary to draw the patella forward.

The recovery was uneventful. There was very little pain, and practically no elevation of temperature. The wound was healed in one week; and motions, which were not in the least restricted, were allowed at the end of one month. A leather knee splint, to prevent any sudden violence and the possible tearing away of the newly attached tendon, was worn during a part of the time for a few months.

As soon as the patient was able to be about, even though one patella was in place and the action of the knee improved, the difficulty in completely extending the knee remained, so that the lordosis was not lessened. To correct this, an osteotomy of the femur above the condyles was performed in both legs and the knees straightened. The convalescence from this operation was uneventful, and eight weeks from the time of its performance the left knee was operated upon to correct the position of the patella. The operation was similar to that which was used in the other joint, except that, instead of cutting off the patella tendon and reattaching it, the whole tubercle of the tibia was chiselled off, and nailed to a depression which was made on the inner side of the bone. The reason for this change in the procedure was that, while the other knee had shown no signs of weakness, nevertheless it was my feeling that a bony attachment would probably be more secure. With this, of course, it was not necessary to cut away so much of the attachment of the quadriceps extensor above the patella.

Instead of the primary union, as was obtained in the other knee, the tendon and the piece of transplanted bone sloughed considerably, so that, instead of healing in one week, about three

months were necessary before the wound was entirely closed. During much of this period the patient was able to be about, but the healing was not complete until then. The functional result in this joint is also not as good as in the right; and, while complete extension is possible, there is only about 90 per cent. of motion in flexion.

Since the operation there has never been the slightest indication of the old pain in the back, the lordosis has been corrected, the gait is much improved, and, except for the limitation in flexion in the left knee, the patient is perfectly well, with the normal function of the joints. On walking or standing, the inward rotation of the legs has disappeared; and, on sitting, complete extension of the leg is easily performed entirely without the twist of the leg that developed with the attempt at such movement before the operation. It is now seven years since the last operation was performed; and during much of that time the patient has been at work in a factory, able in every way to meet the demands made upon her.

Case 2.—Miss M. L. O'B., thirty years of age, was seen, in consultation with Dr. Charles Putnam, in April, 1887.

Since childhood both knees had slipped on slight provocation, the condition having come on without injury or other known cause. The slipping caused great inconvenience, producing frequent falls, and being followed commonly by joint swelling.

Bandages, massage, and appliances had been thoroughly tried, and failed. Accordingly, both knees were operated upon; and the inner portion of the capsule of the joint was shortened, so that, when the wound was closed, it was impossible to slip the patella out of the trochlea groove. At the time of this operation the importance of attachment of the patella tendon in its relation to the line of pull was not appreciated by me; and, as there was no literature upon the subject, this feature was entirely ignored.

After the operation the wounds were tightly closed, and the period of healing was uneventful. Very soon, however, after the patient began to go about, the capsule stretched again, so that the dislocation recurred, there being no permanent improvement from the operation.

Further operation was refused by the patient.

Case 3.—Mary F., seventeen years of age, was seen May 29, 1897, because of slipping of the left patella, which had begun five or six years before without known injury, and had slipped at infrequent intervals ever since.

At the time of the first examination the chief feature to attract attention was the abnormal length of the patella tendon. The attachment of the tendon in this instance was not noted, and the first operation consisted of shortening the tendon about three-fourths of an inch and quilting the inner side of the capsule of the joint.

The healing after this operation was uneventful, and the immediate effect was satisfactory; but later on, however, the slipping or dislocation recurred, and became as troublesome as before.

As the essential principle of the treatment had been by this time recognized, a second operation was performed Jan. 18, 1901; and the outer half of the tendon was cut away, passed under the undivided portion, and attached well to the inside of the tibial tubercle, as has been described above.

The recovery was uneventful, and no further trouble has resulted. The knee is used freely, and is apparently perfectly strong.

Case 4.—E. R., a girl of seventeen years of age, came under treatment five years ago for trouble with the left knee, which had existed since childhood. Under the simplest movement the patella slipped to the outside, unless controlled by a bandage. There had been no definite injury or known cause for the trouble. The examination showed a strong, well-formed girl with the left knee much relaxed and the patella abnormally moveable, so that displacement to the outside was easily produced. The feet were quite flat, but there was no knock-knee, and the patella tendon was not unusually long. The attachment of the patella tendon was farther to the outside than normal, so that with every contraction of the quadriceps extensor muscle the patella was displaced laterally an abnormal amount.

On April 27, 1899, the patient was operated upon, and the inner half of the patella tendon was cut away and reattached to the periosteum on the inner side of the tibia. At the same time the capsule at the inner side of the joint was tightened by quilted sutures.

The recovery was uneventful; but a few months later the symptoms recurred, and have persisted ever since. The patient is now awaiting further operation in which the outer portion of the tendon is to be transplanted, thus correcting entirely the obliquity of the muscular pull.

In this case, had the inner half been left undisturbed and the outer portion given the new attachment, as has been the case with the later operations, the necessity of the second operation would probably have been avoided.

CASE 5.—M. C., a young woman seventeen years of age, came for treatment in April, 1899, complaining of trouble with both knees. When nine years of age, she was thrown down and one patella slipped out. Soon after this the other slipped, and ever since at intervals varying from a few weeks to a year the slipping has been repeated, sometimes one and sometimes the other giving out. After each slipping the joint has swelled, necessitating quiet and bandaging for a few weeks. The slipping occurred sometimes with violent use and sometimes upon slight movement.

The examination showed a strong, well-formed girl, the only apparent defect being the relaxation and weakness of both knees. The patellæ could easily be displaced laterally; and their lateral movement to the outside, during the contraction of the quadriceps muscle, was quite noticeable. There was no knock-knee, and but slight pronation of the feet.

Previous to consulting me, the patient had had for over a year systematic massage with some mechanical treatment, without improvement, so that after first correcting the pronation of the feet, still without improvement, an operation was performed, in which the outer half of the patella tendon was transplanted to the inner side of the tibia, as has been described above. Both knees were operated upon at the same time. The recovery was uneventful. At the end of four weeks the plaster bandages were removed, and movement allowed in bed. Two weeks later the patient was allowed up, the only protection being a light flannel bandage which was worn during the daytime for a few months.

As to the ultimate result, in the four years which have elapsed since the operation, the patient has been active in sports and games, with absolutely no weakness or symptoms referable to the knees, except that once in a romp she was thrown, wrenching one knee, causing a few days of discomfort. Even in this violence the stability of the joint was not disturbed.

It is an interesting fact that in this case, while the capsule had been much relaxed, and even though no attempt was made to tighten it at the time of the operation, the normal tonicity of the structures returned, with the restoration of the normal mechanical function and the relief of the lateral strain.

CASE 6.—M. C., a young woman twenty-three years of age, was seen in 1895, and treated for marked flat foot. For several years before this the knees had been quite troublesome, slipping occasionally, sometimes one knee and sometimes the other. No definite cause could be assigned for the trouble.

The examination showed a strong, well-developed woman, with quite marked flat foot and with relaxed knee joints, but with no knock-knee. The movement of the patella to the outside during the contraction of the anterior thigh muscles was quite apparent.

Because of the definite character of the flat foot, it was thought wise to correct this first, hoping that by lessening the strain upon the knees the weakness and slipping might be modified.

This, however, did not result, but instead the weakness and slipping became more marked, so that, while at first considerable violence was necessary in order to develop the trouble, gradually the displacement became more and more easy, until it was apt to follow any slight simple movement, naturally causing great limitation of activities.

In May, 1901, an operation was performed, and the outer half of the patella tendon was transplanted. Both knees were operated upon at the same time, and after six weeks in bed regular use began. Since then the patient has lived a thoroughly active life without the slightest evidence of weakness.

Case 7.—C. G., a young girl seventeen years of age, was seen in June last at the Vincent Hospital in consultation with Dr. Mary P. Hurd.

The history was that eight months before the left knee was sprained, at which time the patella was probably dislocated. Without special violence the patella distinctly slipped out two months ago, and since that time it has slipped frequently and with but slight movement. On even turning over in bed, the dislocation often occurred.

The girl was of good height and of fairly good physical development. The left knee was much relaxed, with but little increase in the synovial fluid; and the lateral movement of the patella was so free that with but very little force it could be entirely displaced.

The patella tendon was fully a half-inch longer than normal, and the articular ridge on the outer edge of the trochlea surface of the femur was much less distinct than usual. The angle in the line of pull of the quadriceps extensor muscle was quite distinct. There was slight knock-knee, and the pronation of the feet was marked.

For treatment the pronation of the feet was corrected and the knee strapped with adhesive plaster, and over this a flannel bandage applied; but in spite of this the slipping continued, and, as only when the knee was fixed in a plaster of Paris bandage was the slipping controlled, an operation was advised.

In the early part of July the outer half of the patella tendon was attached to the inner side of the tibia, the only difference from the operation performed in the last two cases being that, as the patella tendon was too long, a lower attachment was made, and the patella drawn down to its normal position.

The undivided portion was not shortened, as it was considered that this would take place unaided with the relief of the strain, as is seen in other analogous conditions.

The result from this operation was disappointing. When use was first allowed, there was no trouble; but very soon the slipping recurred, due apparently to the failure of the new attachment to hold. The slipping was naturally less marked than in the beginning, owing to the removal of the outer half of the tendon; but it was sufficient to cause considerable insecurity in use. To overcome this, a second operation was performed and the tendon reattached, the suture being passed through a hole which was drilled in the bone at the point of attachment. The knock-knee, even though not marked, was also corrected by osteotomy.

The end result in this case cannot be stated; but, as the faulty mechanical features have been corrected, it seems reasonable to expect a stable joint.

Case 8.—N. M., a young woman twenty-three years of age, was first seen in April, 1899. The patella in the right knee had, without known cause, slipped out ten years before; and three times since the slipping had been repeated.

Simple conservative measures were advised, and the patient lost sight of until a few months ago, when she reported in response to a note. In the interval the weakness of the knee with slipping had become more frequent, and the left knee had also given out. In both the capsule is much relaxed, and the displacement of the patella is so easily produced that there was much apprehension on the part of the patient during the examination lest this should happen. The angle in the line of muscular pull was quite noticeable.

For further treatment an operation was advised in both knees, but as yet it has not been performed.

Case 9.—Mrs. W. R. F., twenty-seven years of age, was seen first in May of 1902. The patella of the right knee had dislocated when she was eleven years old, and this had been repeated about once a year for five years. After this there had been no actual slipping until one week before the first visit. In the interval of eleven years the patient had always been careful of the knee, and most of the time had worn an elastic knee-cap.

The examination showed an otherwise healthy person, with the capsule of the right knee joint considerably relaxed. The lateral movement of the patella was abnormally free, and the displacement to the outside during the contraction of the quadriceps extensor muscle was more than normal.

There was no knock-knee, but well-marked flat foot.

For immediate treatment the knee was strapped with adhesive plaster, the flat foot corrected, and an operation advised to permanently correct the trouble. As yet this has not been performed.

Case 10.—F. M., a young and rapidly growing girl of seventeen years of age, was seen in September, 1900, because of the slipping of the patella in one knee, which had but just developed.

The girl was growing rapidly, and all of the structures lacked tone. The knees were relaxed, and the feet also, so that there was marked pronation. This feature was corrected, the knee bandaged, and a course of general tonic treatment with exercise advised.

For a time there was marked improvement following the treatment; but of late the slipping has recurred frequently, so that the patient has asked to have the operation performed and is simply awaiting a suitable time.

In considering such a series of cases, it is at once obvious that the number is too small from which any positive conclusions can be drawn. At the same time there are certain features which are suggestive for application in the treatment of other cases. In the first place the lesion seems peculiar to girls or young women. It develops at the period of rapid growth, from twelve to sixteen years of age. It may develop either with or without violence. It is usually associated with flat foot, which is probably a factor in the development of the weakness of the knees. True knock-knee is sometimes present. In all of the cases the tubercle of the tibia was displaced farther to the outside than normal, so that the line of pull of the quadriceps muscle contained a distinct angle. In the extreme cases without treatment the dislocation may become permanent, as in Case 1.

It seems probable that, if the condition is seen in the beginning, and the flat foot corrected, together with such treatment

as would tend to improve the general tone, the trouble can be corrected without operation. This has not been possible in any of the cases seen by me, but on general reasoning it seems probable.

If, on the other hand, the dislocation has recurred several times, and the period of osseous growth has passed, the weakness will probably increase unless the faulty mechanical features are corrected by operation.

If an operation is to be considered, the chief point to be borne in mind is the straightening of the line of the pull of the anterior thigh muscle. This is best accomplished by transplanting the outer half of the patella tendon, so that it is attached well to the inside of the tubercle of the tibia. If the tendon be too long, it can be shortened at the same time the attachment is made. The relaxed capsule is undoubtedly a result of the mechanical pull, and can be entirely ignored, the relaxation disappearing as the strain is removed. Of the cases treated, seven were operated upon and two of the others are awaiting operation. Of the operated cases, four had the outer half of the patella tendon and one had the entire tendon transplanted to the inside; and, as three had both knees treated, there were eight operations with normally strong joints in seven, the ultimate result in the eighth being uncertain, as sufficient time has not elapsed since the operation. Of the three cases in which other operations were performed, in one with both knees the capsule was quilted, in one the patella tendon was shortened without transplantation, as well as quilting the capsule, and in one the inner half of the tendon was transplanted as well as quilting the capsule. All relapsed. In one of these a second operation with the transplantation of the outer half of the tendon was performed with a perfect result. In both of the other cases I am very sure that, if another operation could be performed and the tendon transplanted, as has been described, the mechanical feature which makes the dislocation possible would be removed, so that the slipping would cease.

VIII.

AN UNUSUAL CASE OF POTT'S ABSCESS.

STEWART LEROY M'CURDY, M.D.

A young man aged eighteen had an acute periostitis of anterior surface of maxillary bone, which was followed by infection of orbital cavity with complete destruction of the eyeball. Secondary infections developed, the most important one being destructive disease of the lower dorsal vertebra, which ran an acute course. The destructive process extended over a period of three years. An abscess developed, which occupied the left half of the abdominal cavity. A cough had developed, and considerable pus was expectorated. It was not thought that the abdominal abscess had anything to do with this, but it was instead concluded that there had been a secondary deposit in the lungs.

The abscess appeared below Poupart's ligament, and was incised. It was irrigated daily with peroxide of hydrogen. The cough was exaggerated sufficiently to suspect that there might be some communication.

Methylen blue was added to sterile water, and irrigation of the cavity from below Poupart's ligament is causing the patient to expectorate the coloring matter, showing conclusively that there was a continuous passage from the anterior surface of the thigh through the abdomen, lungs, air passage, and mouth.

The case is reported for record.

Presented at the Seventeenth Annual Meeting of the Association, Washington, D.C., May 11–14, 1903.

ABSTRACTS.

SCOLIOSIS.

141. A Contribution to Animal Scoliosis. From Professor Vulpius's Surgical Orthopedic Institute, Heidelberg (19 illustrations, 3 references). By Dr. Ottendorf, First Assistant. *Zeitschr. f. orth. Chir.*, Bd. XI. s. 803–826.

The author studied in careful detail, so far as the preparation of the specimens permitted, eleven cases of animal scoliosis from the veterinary school at Hannover. The histories of the specimens were not obtainable.

These cases presented pathological pictures so similar to human scoliosis in their variety that Ottendorf was led to infer that similar influences had caused the development of the curves, rotation, etc., in spite of the absence of vertical functional weight-bearing as a factor in the case of the animals.

He classified them as follows:—

I. Congenital.
   (*a*) Supernumerary half vertebra (horse).
   (*b*) Pressure owing to lack of room in uterus (3 goats, 1 calf, 2 unknown).

II. Acquired.
   (*a*) Rachitis (pig).
   (*b*) Habit (?), (bullock).
   (*c*) Deforming spondylitis (plastic inflammation of bone substance, bullock).
   (*d*) Ankylosing inflammation of vertebræ and ligaments, Marie type (bullock).

Ottendorf quotes approvingly Zuppinger's theory that side pressure on the front of the chest starts rotation by rib leverage. The static influences coming in later serve to increase and fix the deformity in case of plastic bones. Some of his cases serve especially well to illustrate this process by inference, as follows:—

An animal lies down much during a prolonged illness, and soon lies chiefly on one side, as most comfortable. During this time the bones are soft and plastic. Rotation is started by the side pressure on front of chest; and the curve, wedging of vertebræ, etc., follow in natural sequence.

Ottendorf infers in one case, in which not only the vertebral bodies are ankylosed, but also the spinous processes (and which he classes as congenital), that the fusion of the spinous processes occurred first, thus locking the vertebræ together, so that continued growth of the bodies caused them to crowd out into a form in which they were also fused together later. The lordosis shown by the specimen is consistent with this explanation.—*G. W. Fitz, Boston.*

142. A Defence of the Hessing Corset. By Dr. Carl Haselrock. *Zeitschr. orth. Chir.*, Bd. XI. Heft 4, pp. 776–780.

Dr. Haselrock takes exception to Becker's unfavorable criticism of the Hessing corset in the first number of the *Arch. f. Orthop. Mechamtherap u. Unfall Chir.*, and enthusiastically claims for it superiority to a stiff corset (of leather, felt, steel) in scoliotic and other cases on all points except that of corrective force in rotation. He bases his claims on a large practical experience in the use of the corset, having furthermore in many instances replaced the stiff kinds by the Hessing.—*G. W. Fitz, Boston.*

143. The Present Status of the Treatment of Lateral Curvature. *N.Y. Med. Record,* Dec. 5, 1903. By Jacob Teschner.

J. Teschner adduces evidence corroborating his views advanced some years ago regarding the efficacy of gymnastics in the treatment of lateral curvature of the spine. He criticises rather severely other writers for their statements, and for advocating other methods of treatment, even though his be mentioned. Several figures accompanying the paper illustrate the good results of muscular efforts in the correction of marked deformity of the spine. The point most strongly emphasized is the necessity of the personal supervision of a physician who understands the method. Sending patients to ordinary gymnasiums is almost always of no practical benefit.—*Abst. Am. Med.*

SPINE.

144. Tabetic Osteoarthropathy of the Vertebral Column. By Dr. Graetzer, Görlitz. *Deutsch. med. Woch.,* Dec. 24, 1903.

Dr. Graetzer comments upon the infrequency with which tabetic osteoarthropathy of the vertebral column appears in the literature,—only eleven cases of this in several hundred cases of osteoarthropathies.

He describes a case treated at Görlitz, as well as the X-ray picture which accompanies it.

He alludes briefly to the cases described by Pitres and Vaillard, Abadie, and Krönig.

Treatment was by the Hessing-Hoffa corset, with relief.—*David Townsend.*

145. The Treatment of Paraplegia in Tuberculosis of the Spine. Some Suggestions and a Review of Recent Work. By J. Jackson Clarke, M.B. Lond., F.R.C.S. *The Practitioner,* London, September, 1903.

The article is illustrated by two skiagraphs which show the character of the thickening produced in spinal caries. There are also several instructive cuts of apparatus.

Mr. Clarke states that, when paraplegia supervenes in the course of spinal tuberculosis, the seat of disease is generally at or above the mid-dorsal region. Rest in either the prone or recumbent position is not uncommonly successful as a method of treatment. Some cases, however, present rapid onset with supervening myelitis; and here operation must be resorted to without delay.

In order to get a clear idea of clinical conditions, the following grouping of cases is made:—

1. Cases in which the paraplegia (chiefly motor) comes on gradually, and gradually disappears when the patient is put to bed.

2. Cases in which the paraplegia (chiefly motor) persists, in spite of rest in bed with extension of the spine.

3. Cases in which the paraplegia develops rapidly, is both motor and sensory, and, if not soon relieved, passes into myelitis with bed-sores.

4. Aberrant cases; *e.g.,* where pressure is due to bone, and not, as is usual, to the formation of solid or liquid tubercular matter, at the front of the spinal cord.

Laminectomy is then discussed as an operative procedure. The cases of W. Arbuthnot Lane (1890–91) are rehearsed in detail,—eight cases in all,—with the following results: one relapsed; one showed no sign of improvement; five were permanently relieved; one died from rectal polypus. The author presents the following objections to laminectomy: sound arches of the spine are removed at the seat of disease; tubercular matter is evacuated by a route which exposes the whole circumference of the cord to tubercular invasion.

Forcible correction of the angular deformity: Mr. Clarke has abandoned this as a hazardous proceeding, though he at one time favored it in a case that had resisted treatment by a year's rest in bed under the most favorable circumstances.

C. B. Keetley (1890), after doing a laminectomy on a boy of fourteen years, did also a "lateral trephining." This case was unproductive of good results, and Mr. Clarke regards this operation as a dangerous one in ordinary hands.

Menard (*Revue d'Orthopédie*, Nov. 1, 1894) recommended "costo-transversectomy" as a substitute for laminectomy, and reported two successful cases. He removed several transverse processes; but this, the author states, involves injury to the pleura.

Case A.—Here Mr. Clarke did laminectomy, and there followed temporary improvement. In the course of ten days the paraplegia rapidly became complete, involving the bladder and sphincter ani. Guided by a skiagraph, Mr. Clarke did a costo-transversectomy, removing only the right transverse process of the eighth dorsal vertebra and the neck of the corresponding rib. He says, "I was strongly impressed with the fact that, had this second operation [costo-transversectomy] been performed in the first place, laminectomy would have been altogether unnecessary." The improvement was steady, and the patient will soon be allowed to walk with crutches and spinal support. That the cord underwent some organic change is evidenced by slight ankle clonus and the presence of Babinski's sign on both sides.

Case B.—This patient was under observation in the hospital for eight months before the operation, the paraplegia gradually becoming complete. Costo-transversectomy was done directly, without a preceding laminectomy. The neck of the rib and the transverse process of the fifth dorsal vertebra were removed, the abscess cavity was scraped with a small Volkmann's spoon. It was necessary to repeat the operation to establish good drainage. The patient was walking well and naturally in less than eight months after the operation.

The recital of this case before the Clinical Society of London encouraged Dr. W. H. B. Brook to perform costo-transversectomy. Mr. Clarke reports this case also. The result was that the patient could walk.

Case C.—Here the operation, costo-transversectomy, was done first on one side; and, as no improvement resulted, it was then done on the other. When last reported, the patient had strong movements in the legs, but could not yet walk.

Case D.—In this case, meningitis appeared shortly after operation; and the patient died. Mr. Clarke is of the opinion that he operated too early; *e.g.*, before the tubercular material had undergone liquefaction.

The ages of these patients were, in order: Case A, 45 years; Case B, 4 years; Case D, 4½; Case D, 16 years; Dr. Brook's case, 17 years.

The following conclusions are made:—

1. When paraplegia develops rapidly and involves sensory as well as motor functions, operative interference is necessary.

2. In other cases try rest in bed with extension. If this fails, get a good skiagraph and drain the abscess, preferably by costo-transversectomy.

For bed treatment the Bradford frame is recommended. For a support either the Taylor or Chance brace is recommended: plaster jackets, as a rule, will only supply support up to the seat of deformity.—*Nathaniel Allison, St. Louis.*

146. A New Method of Applying the Plaster Jacket, and a New Stretcher for the Recumbent Treatment of Spinal Tuberculosis. By S. J. Hunkin.

Appliances for the treatment of spinal tuberculosis are of value in proportion as they confer immobility, and shift weight from the diseased area. This is best accomplished by leverage, thereby increasing weight borne by articular processes; for, fortunately, these surfaces, unlike what occurs in other joints, are rarely affected by tuberculosis. No apparatus is made that can support body by lifting, on the principle of the double. Such furnished support would be impossible after the first few hours by the body adapting itself. All apparatus must be considered as antero-posterior levers, and are efficient only as they force the transmission of the superincumbent weight to a plane posterior

to the diseased area. This manœuvre being easy to accomplish where the normal curve of the vertebral bodies is convex anteriorly and hard where the normal curve is concave anteriorly, these curves can be somewhat changed in extent and the lever efficiency increased.

In winter of 1897 and 1898, at the Children's Hospital, San Francisco, an endeavor was made to increase the efficiency of the straight jacket by cutting it through after it was hard along the curve of the ribs, in the anterior three-fourths of its circumference, leaving it intact posteriorly at the kyphos level, either springing it apart in front, 4 or 5 and even 6 cm. This procedure, while tiresome, gave greater efficiency in the jacket. Lately a somewhat similar result has been secured by using a modified apparatus of Goldthwaite, and it is this instrument which was shown.

There is an essential difference in the mechanics of this instrument, compared with the suspension sling. The latter straightens the spine, the original intention being support by lifting; while the former increases the curve of the column, and endeavors to promote a long posterior curve, giving support by leverage. It has no advantage in lumbar disease, but in the mid-dorsal region its greater capacity is manifest; and the extent of efficiency of the plaster jacket is increased upwards at least two vertebræ and in just the region where the old appliances are faulty.

There is also presented a stretcher splint for the recumbent treatment of spinal tuberculosis based upon the same principles, and the outcome of the instrument before shown. It is primarily the Bradford gas-pipe frame, but curved in its length, so that its superior surface is convex. The curve can be changed both in position and altitude. No provision for traction is provided, that being considered unnecessary in the majority of cases and in many harmful. Children are quite comfortable on the stretcher, and often express relief on it after having been on a straight stretcher.—*Abst. Transactions of Medical Society of the State of California*, 1899.

147. Acute Osteomyelitis of the Vertebral Column. By Dr. Grisel. *Revue d'Orth.*, Paris, September, 1903.

But 41 cases of acute osteomyelitis of the spine were collected and reported by Dr. Hahn up to 1899. Dr. Grisel adds a few more collected and two cases observed on the service of Professor Kirmisson at the Trousseau Hospital.

There is a detailed account of these two cases, then a review of the subject. Lannelongue in 1879 reported the first complete description of the affection. Subsequently other cases of his were published.

Grisel found 64 reported cases, but reduces the number to 56 after careful investigation. There were then 8 of a doubtful nature. In some cases a typhoid condition comes on, and the local condition is comparatively masked. There is, however, the local rigidity, abdominal or thoracic pain.

In another form the process is slower, the local symptoms are more marked and attract attention, while the general process is less prominent, age varies from 9 to 12 years, overwork, trauma followed by local pain, more often in the lumbar region. The pain increases, the spine is held rigidly at the seat of disease. The patient appears ill, and has to go to bed. The patient is sent to the hospital often with the diagnosis of typhoid, pneumonia, pleurisy, or peritonitis.

At first there are stiffness, tenderness, and pain without signs of fluctuation. Then swelling comes on slowly, with œdema and prominence of local veins. In about ten days there is a temperature of 39° and locally deep fluctuation. Incision and drainage is indicated, and the vertebræ are found denuded of periosteum. Laminectomy is sometimes necessary. Persistent fistulæ are exceptional. In the 56 cases, 53 are carefully reported: 30 died, 23 recovered.

Region of Deformity.	*Recovered.*	*Died.*
Suboccipital	1	4
Cervical	2	2

Region of Deformity.	*Recovered.*	*Died.*
Dorsal	7	3
Lumbar	13	15
Sacral	0	6

Sacral cases all died.
Occipital, four-fifths died.
Dorsal, one-third died.
Lumbar and cervical, one-half the cases died.

Affected Area.	*Recovered.*	*Died.*
Body of the vertebra	7	22
Arc of the vertebra	16	8

In affections of the arc two-thirds recovered.
In affections of the body one-third recovered.

ETIOLOGY.

Age.	*Number.*	*Age.*	*Number.*
0– 5 years	7	16–20 years	6
6–10 "	12	21–25 "	4
11–15 "	14	26–30 "	5

Boys, 34; girls, 14.

The cases where bacteriological examination was reported were classed as follows:—

Staphylococcus aureus	13
Staphylococcus albus	1
Streptococcus	2
The three combined	1
Tetragenous	1

Osteomyelitis of the spine follows the general rule, and the staphylococcus aureus is the most frequent cause.

Osteomyelitis of the body vertebræ	19
Osteomyelitis of the posterior arc	21
Osteomyelitis of the whole vertebra	3

Rigidity and spasm are constant, but deformity is not common. Only 5 cases in 56 show any deformity.

The line of abscess, the pressure on the cord, the presence or absence of meningitis, is studied and classified. Sequelæ and complications are noted. A careful detailed review of the disease is systematically made. The article is well worth reading.—*Robert Soutter, Boston.*

148. **Acute Spinal Osteomyelitis.** By Dr. Grisel. *Rev. d'Orth.*, November, 1903 (concluded).

This disease is as common in the posterior arc as in the body of the vertebræ, while tuberculosis is nearly always in the body vertebræ, a posterior affection being the exception in Pott's disease. In 21 cases of disease in the posterior arc, none were in the cervical region; 6 were dorsal; 15, lumbar.

Osteomyelitis of the body of the vertebræ is of a more serious nature than that of the posterior arc.

In 22 cases there were 14 deaths and 8 recoveries. In these cases there are but two alternatives, incision and drainage, followed by rapid recovery or death.

There are but 3 cases of osteomyelitis of the bodies in the cervical region.

Two cases were complicated by abscess in the spinal canal. The abscess may often be felt when anterior. In this region the involvement of the nerve centres makes the disease quite serious.

There were 5 cases of disease of the bodies in the dorsal region, with 3 deaths. Dorsal osteomyelitis is then very fatal. Of the 2 cases that recovered, 1 developed a permanent fistula, the other a myelitis, making the prognosis extremely bad for all cases. The lumbar region is the common place for both anterior and posterior osteomyelitis.

Dr. Grisel collected 14 cases of osteomyelitis of the lumbar bodies. Only 4 cases recovered. The disease here takes the form of a phlegmonous periostitis. Cure is affected in those cases where the abscess is incised and is found to be superficial, and not extensive. As a rule, the disease in this region is apt to infiltrate with pus the spinal canal or the lumbo-sacral or lumbo-iliac muscle groups.

There were 5 cases of osteomyelitis of the atlas and axis. Death comes from general infection.

Meningo-encephalitis. The complications make the disease in this region particularly serious.

There were 7 cases of sacral osteomyelitis, with only 1 recovery. This 1 case was superficial, though considerable pus collected in a very short time.

Treatment is carefully considered for each locality,—*i.e.*, for the anterior or posterior arc in the cervical, dorsal, lumbar, sacral, or axio-atloid regions,—and is based on the outcome of the cases which were examined at operation or post mortem. In some regions, incision and drainage of abscess have proved sufficient, while extensive operations failed to give results. It is noteworthy that 40 out of 56 cases died from general infection, complications of pleuro-pneumonia or meningitis, before the diagnosis was made and before abscess had formed to indicate operation. It is of interest also that simple incision of the abscess without extensive operation preceded every case that recovered.

This article of Dr. Grisel must have entailed a great deal of work and the most patient consideration of detail. It is interestingly written, doubtful cases are eliminated, the material of value in each case is carefully classed, and the reader allowed to draw his own conclusions.—*Robert Soutter, Boston.*

149. Hystero-traumatic Kyphosis. By Deléarde. *Gaz. des Hôpitaux*, No. 75, 1902.

Treats of etiology, symptoms, prognosis, and therapy of the so-called Brodie's disease. Recommends the epidural injection of 1 per cent. cocaine and the application of ethyl chlorid to the spine. His patient was cured in twenty minutes.—*Abst. Zeitschr. f. orth. Chir.*, xi. 3.

150. Spinalgia as an Early Symptom of Tuberculous Infection. By J. Petruschky. *Muen. med. Woch.*, 1903, No. 9.

Petruschky has noticed that "pains between the shoulder blades" is a frequent complaint of persons who later exhibit symptoms of tuberculosis. He thinks that they have some connection with a primary tuberculous inflammation of the bronchial glands, and can therefore be accepted as one of the earliest signs of the infection. At a recent autopsy he discovered recent secondary infection of one apex, with evidences of old tuberculosis lesions in the bronchial glands, although nothing during life had suggested the possibility of tuberculous infection, and the child had died from scarlet fever. He affirms that it is possible to detect the presence of the primary bronchial involvement by the spinalgia referred to above, the typical sensitiveness to pressure of certain vertebræ between the second and seventh dorsal. They show a trace of lordosis usually, and appear to the finger to be a little broader, softer, and more elastic than their fellows. The symptom is valuable only when these spinous processes are distinctly more sensitive to pressure than the others. The diagnosis of tuberculosis was confirmed by the

tuberculin test in all but 2 out of 79 cases of this spinalgia, while none of them developed a spinal affection. 32 were children under sixteen, and 45 were adults. In only 14 were any signs of tuberculosis to be discovered in the lungs at the time. On the other hand, spinalgia was scarcely ever observed in advanced tuberculosis. Primary infection of the bronchial glands is a more dangerous lesion than when the glands in the neck are affected, although infection from the latter is liable to spread to the bronchial glands at puberty. Petruschky is an advocate of tuberculin treatment as the most rational and certain of all means of preventing general infection from glandular lesions.—*Abst. Jour. Am. Med. Ass'n.*

151. **Spondylitis Deformans.** By John Rurah, M.D., Baltimore, Md. *Am. Jour. Med. Sciences,* November, 1903.

Rurah reports a typical case of spondylitis deformans in a woman twenty-two years old, in which the entire spine, the shoulder joints, and hip joints were affected.

He describes bony deposits in or under the muscles of the neck, close to the vertebræ, which could be felt.

The literature of the subject to date is very carefully reviewed and analyzed, and the history, nomenclature, etiology, and pathology studied in detail. The important points in diagnosis and differential diagnosis are fully brought out.

Photographs of specimens in the Museum of the College of Physicians and Surgeons, Baltimore, are given. An extensive bibliography of the subject is appended.—*John L. Porter, Chicago.*

BONES AND JOINTS.

152. **The Distribution of the Nutritive Arteries of Bone and its Relation to Disease Foci.** By Lexer. XXXII. German Surgical Congress. *Centr. f. Chir.,* 1903, Suppl.

Why tuberculous and suppurative processes are localized with particular frequency in certain bones or segments of them has not yet found satisfactory explanation. Tuberculous infarctions indicate some relation to the circulation of the bones. This he attempts to show by means of mercurial injections of the bones of new-born and young children.

The conclusion is drawn that all focal bone diseases which are connected with the circulation depend for their localization upon the distribution of the arteries, that they therefore are produced by clumps of bacteria or infective emboli. Infarcts arise in such places only as have end arteries. The fact that the embolic process is more frequent in tuberculosis than in suppurative disease explains the difference in frequency of the part of the bone affected in these two diseases; *e.g.,* the joint ends and the short hollow bones. The frequent occurrence of such embolic processes in the bones of the young can at present be explained only by their relatively greater vascularity.—*A. H. Freiberg, Cincinnati.*

153. **Congenital Dislocations of the Radius.** By Charles A. Powers, A.M., M.D., Denver. *Jour. Am. Med. Ass'n,* July 18, 1903, xli. 165, No. 3.

The writer describes a case of congenital dislocation of the radius in a boy thirteen years old, and discusses other reported cases. Two photographs and a skiagraph accompany the text. He concludes that absence of pronation and supination is the most characteristic symptom.—*R. B. Osgood, Boston.*

154. **Treatment of Inveterate Fractures of the Patella.** By Schanz. Trans. XXXII. Germ. Surg. Congr. *Centr. f. Chir.,* 1903, Suppl., p. 157.

Case five years' standing, with 12 cm. separation of fragments. No power of extension at knee. The sartorius was loosened at the lower part of its

belly, but without severing its bony insertion. A vertical groove was chiselled into the anterior surface of the fragments, and the belly of the muscle sewed into this groove. After six weeks in plaster the patient was able to climb stairs, and finally regained power of extension completely.—*A. H. Freiberg, Cincinnati.*

155. Osteoma of the Knee Joint. By R. T. Taylor. *Annals of Surgery*, January, 1903, p. 84.

Taylor reports a case of osteoma of the knee joint to emphasize the great importance of the skiagram by making the diagnosis possible in such cases, and the value of the X-ray in pointing out the proper mode of treatment when the foreign body is not palpable. Three X-ray pictures of the case in question were taken, showing the foreign body in the joint, which projected over and into the intercondylar notch. The X-ray stereoscope showed that it was attached to and near the external side of the internal condyle. At the operation the foreign body was seen occupying a position between the condyles, as shown in the skiagram.—*R. B. Osgood, Boston.*

156. Bony Changes in Gonorrheal Arthritis. *Wien. klin. Woch.*, Jan. 15 and 22, 1903.

R. Kienbock has observed after injuries and inflammatory processes of extremities, especially after grave gonorrheal metastatic arthritis, changes arise in the skeleton, usually spoken of as "inactivity atrophy" of the bones, but more correctly considered as acute osseous atrophy. It also occurs after injuries and acute diseases of the nervous system. Pathogenetically, this atrophy is in line with other trophic changes, such as muscular atrophy, synovial changes, etc. It begins four to eight weeks after the onset of the disease, nearest the area of inflammation, radiating from it in different directions. It usually affects only the spongy bone at first, the radiographic picture showing this through lighter shadows and slight changes in contour. The greater the absorption of lime salts, the lighter the picture. The diaphysis, cartilage, and the surrounding soft parts are affected later. The treatment should consist of massage, passive and active movements, faradism, and artificial passive congestion. Numerous photographs illustrate the stages of the condition.—*Abst. Am. Med.*

157. Some Remarks on Brisement Forcé, etc. By Dr. Franz Staffel, Wiesbaden. *Archiv f. orth. Chir.*, i. 2, 1903.

When we use *brisement forcé*, we tear. The less the actual growing together of the articular facets, the better our chances in such procedures. Bony bridges, as may be demonstrated by the X-ray, should warn us against *brisement forcé*. A discussion of indications and the injury done by the operation follows. The value of the proceeding depends to a great extent upon the after-treatment. The best position of fixation in the elbow is the right-angled position; but, if we wish to preserve what motion we have gained, we must remove our fixation after twenty-four to forty-eight hours. However, if we take off the splint at the end of that time, the fore arm sinks on account of its weight. Passive motion causes great pain, but whatever motion we get must include the position of a right angle on account of the usefulness of the arm at that angle. According to the writer the most advantageous apparatus in after-treatment is a splint with strong elastic, adjustable bands (*Gummizug*), which must be applied after the *brisement forcé*. Such a course, in conjunction with baths, massage, and exercises, guarantees the best result; namely, motion at a favorable angle. Its great advantage lies in the fact that motion can be maintained without pain.

After *brisement force* of hands and fingers, such after-treatment is of equal value. Then follows a description of apparatus and a report of a case.—*Henry Feiss, Cleveland.*

158. The Frequency of Joint Affections in Hereditary Syphilis. By E. Hippel. *Muen. med. Woch.*, No. 31, 1903.

E. Hippel has found joint affections in hereditary syphilis frequent, especially in cases which during their first years were insufficiently treated with antiluetic remedies. Individuals with parenchymatous keratitis usually belong to this class. Of 77 such patients, 56 per cent. presented joint lesions. In most of them the ocular and joint diseases existed either simultaneously or the arthritis preceded the ocular disease. The knee joint was oftenest the seat of the disease, and in nearly all cases both joints were the seat of a serous effusion of long standing. As the lesion usually occurs between the fifth and twentieth year, and is often unassociated with other signs of syphilis, the diagnosis may be almost impossible. Subjective symptoms are very rare. A positive diagnosis can always be made with antiluetic treatment, which produces a cure in almost every instance.—*Abst. Am. Med.*

159. Traumatic Separation of the Epiphyses. By Dr. Eugene Joüon, Paris. *Rev. d'Orth.*, November, 1903.

Dr. Joüon reports three cases of traumatic separation of the epiphysis, one of the upper end of the humerus and two of the lower end of the radius.

Joüon makes a careful reduction, and puts the limb in plaster of Paris for twenty to thirty days. Motion and massage and fear of ankylosis are of secondary consideration compared to the position. The great danger in these cases is deformity, functional disuse, and lack of growth of the bone from injury to the epiphysis.—*Robert Soutter, Boston.*

160. A Case of Substitution of a Piece of Ivory for the Whole Diaphysis of the Radius. By Dr. Karl Vogel, Bonn. *Deutsch. med. Woch.*, Nov. 12, 1903.

Dr. Vogel briefly discusses the subject of bone transplantation, the substitution of animal bone previously decalcified and sterilized, and the use of ivory as a plastic material in disease of the bone, as in cases where the bone is defective or entirely gone. He describes a case of a child of eight years where the diaphysis of the radius was destroyed, but the periosteum and ends of the radius remained, and a piece of ivory was substituted in its place. At the end of a year this showed a new subperiosteal growth of the epiphysis, as well as of the diaphysis. The article is illustrated by three X-ray pictures.—*David Townsend, Boston.*

161. On Mueller's Operation in Spina Ventosa. By Dr. O. Erhardt, Königsberg. *Muen. med. Woch.*, Sept. 29, 1903.

Erhardt describes Mueller's operation for spina ventosa, which consists in substituting a periosteal piece of bone, chiselled out of the ulna, for the diseased diaphysis. He mentions 6 cases of spina ventosa treated in the Königsberg surgical clinic, in which the periosteal piece of bone was taken from the tibia instead of the ulna, in order not to weaken too much the ulna. In all of the cases there was disease of a metacarpal bone; and in one there was, in addition, disease of the first phalanx of one of the fingers. Union was by first intention in all the cases, with good result.—*David Townsend, Boston.*

162. Progressive Subluxation of the Carpus. By Dr. J. Abadie, Montpellier, France. *Revue d'Orth.*, November, 1903.

In the case reported the ulna is subluxated backward, the hand is displaced to the radial side, the radius retains its relation to the carpus.

The first row of carpal bones are in slight dorsal flexion on the second row. The lower curve of the radius is concave forward.

The ulna is normal in its upper two-thirds, but curves toward the radius in its lower one-third.

The subluxation of the wrist is the most noticeable thing, together with the shortening of the fore arm and exostoses of the radius.

The case is studied minutely, and the literature is reported and tabulated in an interesting manner.

The collected cases are divided into those where normal relation of the radius and carpus is preserved and those with loss of these normal relations. Nearly all the cases are associated with deformity or hypertrophy of the ulna and abnormal curves of the radius.

The cases with loss of the normal relations of the carpus to the radius are rarer and without bony lesions.

These subluxations do not include those of traumatic or of inflammatory origin.

Treatment consists in apparatus, electricity, and massage, but generally osteotomy is necessary.—*Robert Soutter, Boston.*

163. Treatment of Surgical Tuberculosis. By A. Bobroff. *Roussky Vratch*, ii., No. 3, St. Petersburg.

Seacoast and Sun Baths in Surgical Tuberculosis.—Bobroff reports most gratifying results from the sanatorium for children which was established in Crimea, mainly through his efforts. The sea air in this balmy climate, the sun, and sea bathing are all important factors in the treatment of localized tuberculosis. He lays great stress on direct exposure of the site of the lesion to the sunshine, protected merely by a sheet.—*Abst. Jour. Am. Med. Ass'n.*

164. Application of Bone Fillings to Osteomyelitis. By N. Damianos. *Wiener klin. Rundschau*, No. 30, Vienna.

Treatment of Osteomyelitis with Iodoform Filling.—Damianos illustrates a number of specimens and cases to support his assertions that chronic osteomyelitis is essentially an affection of the spongiosa, which fact has been overlooked heretofore in treatment. In reality, the irregularly distributed foci of granulation are the principal cause of the development and persistence of chronic myelitis. The spongiosa should be removed far into sound tissue, and this has been rendered possible by Mosetig's filling. He exposes the bone with a semicircular incision, and turns back the flap of soft parts, which includes the periosteum. He then removes the tissues affected, far into sound tissue, and fills the cavity left with the iodoform mixture described in the *Journal*, xl. p. 1544. Damianos gives radiograms of a number of patients thus treated with complete success, the limb functioning perfectly, free from pain and any tendency to recurrence of the bone affection.—*Abst. Jour. Am. Med. Ass'n.*

165. Tuberculosis of the Joints. By C. Fernet. *Bulletin de l'Académie de Médecine*, Paris.

Fernet's experience has confirmed that of others in regard to the manifestations of tuberculosis in the joints. They may assume an acute or chronic form, and they resemble in many respects those of articular rheumatism. They have been called, therefore, tuberculous rheumatism, tuberculous pseudo-rheumatism, etc.; but he protests against these appelations as indicating a relationship to rheumatism which does not exist. It is more correct to say articular tuberculosis, just as we say pulmonary tuberculosis. In other words, the tuberculosis may manifest itself in morbid series which parallel those of acute or chronic rheumatism in their localization in the joints or elsewhere. But the lesions have nothing in common except their site. They differ in causation, pathologic anatomy, and in their symptoms. They should therefore be differentiated and entitled differently.

166. A Case of Osteitis Deformans with Heart Complications. By Charles J. Foote, M.D., New Haven, Conn. *Am. Jour. Med. Sciences*, November, 1903.

The author describes a case of osteitis deformans, with photographs, which

was under observation in the New Haven Hospital for five years, where he was admitted for treatment for valvular heart disease.

The osteitis affected chiefly the head, spine, ribs, clavicles, and tibiæ. The circumference of the head at the hat-band was 25½ inches, and he wore an 8⅛ hat; while there was a depression in each parietal bone 5 + 6 cm., resembling a collapse of the skull.

The spine had a marked long dorsal kyphos.

The ribs were prominent and enlarged.

The clavicles were very large, especially at the acromial ends.

The tibiæ showed the most marked enlargement, especially about the tuberosities.—*John L. Porter, Chicago.*

167. **Gonorrhœa in Infants, with a Report of 8 Cases of Pyæmia.** By Reuel B. Kimball. *Med. Record,* Nov. 14, 1903, vol. lxiv., No. 20.

R. B. Kimball's conclusions are as follows: 1. Gonorrhœa prevails among infants and children to an extent not fully appreciated by the profession, and has become a common epidemic in institutions where numbers of children are placed together. 2. The ordinary clinical forms which the gonococcus infection assumes in children are ophthalmia, vulvovaginitis, and pyæmia. 3. A series of cases of pyæmia, reported in this paper, occurred in infants in whom no local lesion could be found to explain the mode of entrance of the organism to the general circulation. 4. The suggestion is made that from a stomatitis due to the gonococcus such a systemic infection may arise. Gonorrheal stomatitis in infants is a disease that needs further study. 5. Only by careful exclusion, by microscopic examination, and by complete isolation can this disease be absolutely debarred from a hospital where infants are cared for. 6. There is urgent need of public enlightenment on this subject. Those in charge of institutions for children, trained nurses, and even parents, should be taught the frequency and virulency of this infection and the ease with which it is spread.—*Abst. Am. Med.*

CONGENITAL DISLOCATION OF THE HIP.

168. **Congenital Dislocation of the Femur Treated by Subtrochanteric Osteotomy.** (Kirmisson's Operation.) By Dr. Froelich, of Nancy. *Rev. d'Orth.,* September, 1903.

In cases under seven bloodless reduction is generally indicated. Palliative treatment is sufficient for luxations without much functional disturbance. Such treatment would consist of corsets, high sole, massage, forcible abduction at night. These are often sufficient as for palliative treatment.

However, in bilateral cases with much displacement upward, marked adduction and lordosis, standing becomes very tiresome and even painful.

Subtrochanteric osteotomy for congenital dislocation of the type here reported was introduced in 1892 by Kirmisson, and later adopted by Hoffa and Schwartz.

In the two cases here reported pain was a marked feature, there was extreme lordosis, and great difficulty in walking.

Case 1, nine years old.—Lordosis extreme, left lumbar, right dorsal scoliosis. Hips rotated inward, knees flexed, legs rub together in walking. Child needs support in standing.

Case 2, seven years old.—Hips flexed, knees flexed, hips dislocated high and backward, the trochanters approaching the sacrum with marked adduction, walking was almost impossible. Extreme lordosis, and right dorsal, left lumbar scoliosis.

After six months, cases could stand nearly all day, walking was fairly good, there was no pain in standing and no support was required. Patients stand straight without lordosis. There was a limp, due to the ankylosis.

In doing the operation, subcutaneous tenotomy of the adductors is generally advisable.

The operation on both sides corrects adduction, the patient can keep clean, walking is made easy, the legs are rendered the same length, lordosis is corrected.

Pain was entirely relieved.—*Robert Soutter, Boston.*

169. On the Functional Improvement of Defective Hip Joints. *Zeitschr. orth. Chir.*

In this paper Professor Lorenz discusses chronic pathological conditions of hip joints, which, while due to different causes, present the common feature of imperfect function. The limp is of secondary importance.

He discusses dislocation of the hip due to coxitis, congenital dislocations of the hip which have passed the age when reposition is possible, cases of arthritis deformans coxæ, and old ununited or badly united fractures of the neck of the femur. After discussing the ultimate results of tuberculous coxitis, Professor Lorenz says, "If we disregard the small percentage of coxites which get well with a *restitutio ad integrum*, the preceding investigation leads to the necessary conclusion that the strongest possible at best bony ankylosis of the hip in indifferent position (complete extension without abduction or adduction) represents by far the most desirable result of coxitis treatment as well for the endurance as for the cosmetics of function, and just that method of treatment would be the best which should most frequently lead to this sort of ankylosis."

It is very rare indeed that patients suffering with congenital dislocations of the hip reach a ripe age without discomfort, and without being more or less disabled.

Respecting the third class of cases, interest attaches here to the beginning cases of arthritis deformans, the clinical investigation of which is frequently confined to limitation of abduction, and to the fact that one can palpate a portion of the posterior surface of the femoral head by forced adduction, flexion and extension being entirely free. In these cases, involvement of the joint is followed very quickly by weakness, and pain on motion, with a gradually increasing limp. The Roentgen picture gives the impression that the acetabulum is become too shallow to completely enclose the head. The outer portions of the upper surface of the head appear outside of the upper rim of the acetabulum.

Cases of the fourth class give the impression that the tissue uniting the fracture-ends has stretched under the influence of the body-weight, for the femur receives scarcely any recognizable support from the acetabulum. The palpating finger can recognize neither the femoral neck nor the head. In its functional aspect the condition resembles a luxation. "If one disregards the broken-off head of the femur, one can speak of a luxation of the upper end of the femur, or rather of a luxation-fracture."

Finally, old traumatic hip-joint dislocations which have successfully opposed reposition may be included in these categories, but of such cases Lorenz has no experience.

Functionally defective hip joints are usually treated by one of two surprisingly different methods. On the one hand, they are supplied with portative apparatus. On the other, an operation is attempted by which the loosened connection between the pelvis and the upper end of the femur is made as firm as possible. Apparatus diminishes or does away with pain on walking. Endurance is not appreciably increased. Disadvantages are the unsightliness of the treatment, the drudgery, the expense, as well as the fact that the patient becomes "a slave to his crutches."

The operative procedure partakes of the character of a joint resection. The bony surfaces which are in contact are freshened in order to obtain a bony or strong fibrous union. Disadvantages are the severity of the operation, and, especially in older persons, the uncertainty of the result.

His practical experience with the bloodless reposition of congenital dislocations of the hip enabled Lorenz to recognize a middle way in treating these cases. Not infrequently pre-luxations occur directly upward under

the anterior inferior spine, or upward and a little outward beneath the anterior superior spine, or outward, in which case the head does not support, as in the first two, the anterior pelvic wall, but pressed against the lateral wall of the pelvis. The head looks forward and lies below and without the anterior superior spine. Even in these last cases the functional result could have been much worse. The lordosis was corrected, the limp visibly diminishing, the endurance during walking correspondingly improved. After-treatment consisted in exercises directed toward increasing flexion and hyperextension.

"After these observations the idea occurred very soon to render defective hips, which did not admit a radical cure, better able to sustain weight, and more enduring, through the causing of an ultra-physiological habitual attitude in hyperextension and abduction."

The only new thing is the proposition to increase the desired abduction beyond the physiological limit and to combine it with a similar ultra-physiological overextension attitude. However, the proposal is new to employ this combined joint position for the betterment of the above-mentioned classes of defective hips and, it may be, others like them.

In the treatment of unilateral congenital dislocations the subtrochanteric osteotomy offers an eccentric correction, and therefore compensates. It also results in a bend in the femur, and therefore in a shortening of the already much shortened limb.

Hoffa's oblique osteotomy is dangerous because of the extensive opening of the medullary canal.

In bilateral dislocations, Hoffa's double nearthrosis (amputation of femoral head and application of decapitated surfaces to iliac periosteum) greatly shortens the limbs. It may result in bilateral bony ankylosis, but more likely in loose joints. Finally, it is one of the severest surgical procedures.

The advantages of the anterior transposition are the absence of danger, more or less real lengthening, marked apparent lengthening through abduction, correction of the lordosis, diminished limp, the carrying ability and function markedly improved, and, finally, the patients readily consent to such an operation.

The steps of the operation are stretching of the adductors, traction enough to pull the head down 2–3 cms., overextension, and, last, the head is transposed forward to the neighborhood of the anterior superior iliac spine by a combined movement in abduction and overextension. Should a fracture of the femoral neck occur, it will be incomplete, and will not prevent the immediate anterior transposition of the femoral head. A plaster of Paris spica, which includes the pelvis and thigh to the knee, maintains their mutual relation. A shoe with a high sole on the unaffected foot enables the patient to walk.

After three to four months the abduction is almost corrected, a thickening of 1 cm. being sufficient for the sole of the opposite side. The overextension is not diminished. This second dressing is left in place three to four months.

After-treatment extends over an interval of one to two years before the nearthrosis is become stable. It consists of passive and active gymnastics directed to enabling the patient voluntarily to carry the limb far beyond the limits of abduction and overextension.

Lorenz next reports similar experiences with fractures of the femoral neck in old persons, these being the only other cases of this nature with which he had had practical experience.—*James T. Watkins, San Francisco.*

HIP, DISEASES AND INJURIES.

170. Operation in Hip-joint Disease without Shortening. By R. Preston Robinson, M.D. *Am. Med.*, Nov. 14, 1903.

The writer describes the operation as done on two cases, as follows: The trochanter and upper end of the femur are exposed by a lateral incision five or six inches long. The necrosed or carious bone is then removed entirely, together with all diseased tissues; but care is used to preserve the periosteum

in its entirety or in fragments. After the part has been thus thoroughly treated, the fragments of periosteum are stitched together with catgut to form a connection between the upper end of the resected femur and the rim of the acetabulum. The muscles and connective tissues are then stitched closely over the periosteum, and the wound left open to heal by granulation. Weight is applied to make and maintain extension of the leg, and it must be carefully watched for the first two weeks. The patients are allowed to sit up in bed after two weeks or so, and gentle movements of the leg are instituted daily to mould a new joint.

In each case almost perfect function was obtained with practically no shortening. Skiagraphs showed the bone to have been re-established, and the results were in every respect favorable. Walking was allowed after six months had elapsed, and during the interval extension was maintained by a brace.—*J. T. Rugh, Philadelphia, Pa.*

KNEE.

171. Congenital Hyperextension of the Knee. By Professor Kirmisson. *Rev. d'Orth.*, Paris, September, 1903.

In 1900 Drehmann collected 98 cases. The deformity is rare, more common among females, as is congenital hip; while club foot is more common in males.

It was found to be double 44 times, single 54 times.

Double congenital hyperextension is more frequently associated with other congenital malformations.

Delanglade (of Marseilles) published a case of double congenital hyperextension of the knees. Antero-posterior median frozen sections were made.

The lower epiphysis of the femur was at an angle with the diaphysis of 150° open forward. Kirmisson differentiates congenital luxation of the knee and genu recurvatum. In luxated cases there is total or partial disuse of the articular surfaces. There is no contact of corresponding joint surfaces and angular position of the epiphyses on the diaphyses. This tilting of the epiphysis, the bending of the femur, show long standing malposition. Instead of a curve with posterior convexity, as in hyperextension, the segments remain parallel, and the upper end of the tibia is displaced forward, and there is a hollow, or depression in front of the knee. In congenital hyperextension complete flexion is impossible, even under anæsthesia; but the flexion may be made to 45°, and held there by a gutta-percha apparatus for four weeks. Massage and gentle forceful flexion will increase this to 90°. During the process there may be rupture of many fibrous adhesions, with ecchymosis about the knee. Further massage and passive motion will increase the flexion beyond a right angle.—*Robert Soutter, Boston.*

172. The Isolated Rupture of the Crucial Ligaments of the Knee. By Dr. Pagenstecher, Elberfeld. *Deutsch. med. Woch.*, Nov. 19, 1903.

Dr. Pagenstecher describes three cases of isolated rupture of the crucial ligaments of the knee. Two were of the anterior crucial, one of the posterior crucial. Treatment was by operation in all the cases, with good result.

He speaks of the infrequency with which any observations upon the isolated rupture, or pulling out of the ligaments, of the knee are to be found in the literature. Hints has collected 34 cases of this: 27 were of the internal lateral ligament, 3 of the long external lateral ligament, and 4 of the crucial ligaments.

He describes the action of the crucial ligaments and experiments to prove this. He also shows how difficult it is to produce this isolated rupture of the crucial ligaments on the cadaver.

He quotes a case of Dittel's where the anterior crucial was broken by extreme overflexion of the knee.

Sometimes movable bodies are found in the joint, following a lesion of the crucial ligaments. Pagenstecher describes 4 such cases collected by Barth

from various authors: 3 were at the origin of the posterior crucial, and 1 of the anterior crucial at its femoral end.

Pagenstecher seems to think that injury to the crucial ligaments occurs even more frequently than supposed, and that on account of their hidden position this condition is more easily to be guessed at than diagnosed. He advises operation, even if nothing more than an exploratory one, and opening of the joint, especially in those cases where there is a flail-joint without injury of the external ligaments.

He concludes his article with a general discussion of the condition and of the treatment, and considers that a flail-joint, chronic arthritis, or osteo-arthritis, traumatic arthritis deformans, or possibly free bodies in the joint, may result after trauma of the crucial ligaments. He also has a few words to say on "trigger knee."—*David Townsend, Boston.*

173. **Repair of Ruptured Crucial Ligaments.** *Annals of Surgery*, May, 1903.

Mayo Robson reports that a miner of forty-one, by a landslide in a coal-pit, received an injury to the left knee. He was treated for six weeks in a hospital, and was later admitted to the Leeds Infirmary. The knee was swollen, but free from tenderness on manipulation. When the muscles were braced up, the bones were in good position, but so soon as they relaxed the tibia fell backward until stopped by the ligamentum patellæ. On manipulation the head of the tibia could be brought forward in front of the femur, and there was also very free lateral movement of the head of the femur. There was fluid in the joint and the patella floated. It was evident the crucial ligaments had been ruptured. The joint was opened by a large anterior U-shaped flap, which severed the ligamentum patellæ. Both crucial ligaments were found completely ruptured, being torn from their upper attachments, and the ends being somewhat shreddy. They were sutured in position by means of catgut ligatures, the anterior being sutured to the synovial membrane and tissue on the inner side of the external condyle, and the posterior, which was too short, and therefore split in order to lengthen it, was fixed by suture to the synovial membrane and cartilage on the outer side of the internal condyle. The wound was closed, some pain followed the operation, and there was considerable effusion into the joint. This was let out by removing a stitch, and progress was uneventful. Three weeks after the operation plaster of Paris was applied, and he was allowed to go about on a Thomas splint. The plaster was removed after a month, and massage instituted. Recovery was complete joint function being entirely restored. This operation was in 1895, and in 1898 an operation was performed on another patient for a like condition, the result being equally satisfactory.—*Abst. Am. Med.*

SHOULDER.

174. **Elevation of the Scapula with Congenital Defects of Neck and Shoulder Muscles.** By Kayser. *Deutsch. Zeit. f. Chir.*, lxviii. 318.

Case report (see also *Centrbl.*, 1901) with discussion of muscle defects in connection with elevation of congenital character. The case reported is unique in presenting the combined defect of left sternocleido, part of left trapezius, and shortening of left clavicle. Cervical rib on the right side in addition.

Imperfect descent of scapula in embryonal period is considered the likeliest theory.—*Abstr. Centr. f. Chir.*, 1903, p. 982, *A. H. Freiberg, Cincinnati.*

175. **On Congenital Absence of the Collar Bone.** With illustrations. By A. Gross. *Muen. med. Woch.*, No. 27.

The defect was, as usual, accidentally discovered, as it showed no noteworthy appearance of deformity. There existed also other bone develop-

ment defects, so that the case is probably to be considered as a true arrest of development.—*D. Townsend, Boston.*

176. On the Freeing of the Contractions of the Shoulder Joint. By Professor Dr. A. Ritschl, Freiburg. *Archiv f. Orth.*, i. 1.

The usual method of overcoming the contractions of the shoulder joint is partly manual and partly mechanical, and for the mechanical part Dr. Ritschl recommends, of the many kinds of apparatus, the one he and Dr. Beely constructed. He considers both the manual and mechanical methods necessary, but describes the technique of a purely manual form of reduction, where one pushes the scapula backward with one hand and with the other raises the arm laterally. This has the advantage that one does not have to think of the horizontally fixed arm, and can concentrate his attention more fully upon the movement of the scapula. This method can be used in the vertical as well as the recumbent position.—*D. Townsend, Boston.*

177. Congenital Dislocation of the Shoulder. By Cumston. *Am. Jour. Med. Sciences*, June, 1903.

Cumston reports a case of congenital dislocation of the shoulder in a child five years old, operated upon in April, 1901, by the method advised by Phelps. The patient, when seen in June, 1902, had improved considerably in the use of the arm; and the result was considered most satisfactory. The writer reviews several published cases, and discusses all the theories of causation, of congenital dislocations, but adds nothing to our present knowledge.—*John L. Porter, Chicago.*

FOOT.

178. The Pathology and Treatment of Hallux Rigidus, Hallux Flexus, and Hallux Extensus. By A. H. Tubby. *British Med. Jour.*, Oct. 17, 1903.

Tubby thinks that, notwithstanding the divers causes attributed in these affections, there is one cause which almost invariably underlies all conditions; namely, an osteoarthritis of the first metatarso-phalangeal joint. The structures concerned in this joint are the distal end of the first metatarsal, the proximal end of the first phalanx, its ligaments, and the two sesamoid bones, with the synovial membrane. In these cases there is always found inflammation of the intersesamoid pad and synovial membrane with ulceration of the cartilage. The sesamoids may also be diseased. As the condition goes on, osteophytes make their appearance, especially from the base of the first phalanx, rendering flexion and extension impossible. In speaking of treatment, Mr. Tubby says that, in his opinion, excision of the head of the first metatarsal is undoubtedly the best procedure, but that he prefers, as a rule, to content himself with chipping off the osteoarthritic growths. In the less painful cases, where it is not necessary to operate, careful attention to the footwear is essential; and, if the individual wears a roomy enough boot, giving plenty of space to the big toe, it will afford relief. The sole should be stiff, so as to prevent pressure on the end of great toe while walking. In addition to this it is often necessary to place a pad or bar across the sole of the shoe just behind the heads of the metatarsals, so that the weight of the tread comes not on the heads of the bones, but behind them.—*Harold W. Jones, St. Louis.*

179. Experience with the Phelps Operation for Club Foot. By E. Muirhead Little. *British Med. Jour.*, Oct. 17, 1903.

Little has done the Phelps operation 27 times in the last twelve years; and he divides his cases into two classes, as follows:—

1. Those of such severe deformity that careful and persistent treatment by milder methods has failed to effect a cure, or cases of "necessity."

2. Those, chiefly in hospital practice, which, owing to poverty or indifference, are neglected as regards after-treatment, and relapse again and again, or cases of "expediency."

Mr. Little makes a V-shaped incision, with its base toward the outer border of the foot, with its apex over the tuberosity of the scaphoid. Everything beneath is then divided except vessels and nerves. Occasionally he divides the neck of the astragalus. The tendo Achillis is then cut, and the flap laid across the wound and held in place by one or two silkworm-gut sutures. The foot is put in a board splint for a day or two, and then the granulating area is skin-grafted. After this it is put up in the best position obtainable in plaster. Mr. Little thinks the skin graft a great advantage over the old Phelps operation, and he believes also that the foot should not be put immediately into plaster, since a bulky dressing is then needed, which prevents a good hold being secured on the foot, and also because the hard blood clot later is apt to cause pain, and even sloughs.

The article is abundantly illustrated with photographs of Mr. Little's cases. He concludes:—

1. That in selected cases Phelps operation is of great value, but that a skin flap should be made.
2. That osteotomy is rarely necessary as a part of the operation.
3. That the operation in young children is contraindicated, because of the difficulty of predicting what the ultimate results of growth and pressure may be and the danger of severe flat foot following.
4. That, if for reasons of expediency cases must be operated on young, and flat foot result, the patient is far better off than if he had relapsed or partly cured varus.—*Harold W. Jones, St. Louis.*

180. The Radical Cure of Bunions. *Am. Med.*, Jan. 16, 1904.

Bunions, next to corns, are probably the most common of the various causes of foot discomfort; and in persons whose occupations require them to be constantly on their feet they may cause actual disability. The term is generally used to denote a painful swelling which frequently grows over the inner aspect of the ball of the great toe. In the first stage there is a partial outward dislocation of the great toe, the deviation from the middle line being caused almost always by faulty-fitting shoes which are now commonly worn. Most shoes on sale, no matter how broad the toes and supposedly sensible they are, crowd the great toe outward and thus make the base of the toe more prominent and subject to abnormal pressure. By placing the inner side of the foot of a healthy child against a straight edge it will be seen that the inner border of the foot forms almost a straight line from the toe to the heel. Few modern shoes are made with a straight line from the heel to the toe, though there has been much improvement in footwear of recent years. The abnormal pressure over the base of the great toe forms a bursa, and frequently there is a chronic periostitis, which causes the head of the metatarsal bone to enlarge. Pressure on the bursa makes it sensitive and often intensely painful. Very few doctors are consulted for bunions, and it must be confessed that this is partly because many do not understand their proper treatment. Indeed, the subject is given most inadequate attention in many of the most popular modern text-books on surgery. If physicians appreciated the importance of proper footwear, as emphasized by Sampson in perhaps the most important paper (*Am. Med.*, 1902, vol. iii. p. 105) which has appeared on this subject, they might do much to prevent numerous painful affections of the feet by using their influence to introduce proper footwear; and, if people were provided with suitable shoes from their earliest years, there would be no necessity further to discuss the treatment of bunions. Taken at an early stage, hallux valgus, which precedes the formation of bunion, may perhaps be partly corrected by apparatus; but toe posts, springs, and levers which are used to prevent or correct such deformities are of use only when the condition has not passed the early stage. Freeland, in a recent monograph, believes that of the numerous operations which have been intro-

duced to remove the boss of bone which gives rise to bunion none gives such uniformly good results as excision of the head of the first metatarsal bone. The relief from pain, restoration of function, and reduction of deformity which follow are striking. This method is also recommended by Rose and Carless in the latest edition of their "Manual of Surgery." While palliative or less radical measures may be tried and may give relief in many cases, we believe that excision gives far the more satisfactory results in the treatment of very bad cases of bunion. We are surprised that this method is not mentioned in several of our modern American text-books of surgery.

181. Tarsal and Tarsometatarsal Disease and its Treatment. *Zeitschr. f. orth. Chir.*, 1903, xi.

K. Hosebrock takes issue with all observers who ascribe every pain and other symptom of the foot to incipient or existing flat foot, even in cases where no flat foot or even where a springy foot exists. He sees in them an illness *per se*, a disease of the joints of the tarsus or tarsometatarsus, which is not in the slightest way connected with either chronic or inflammatory flat foot. They are usually either of rheumatic or gouty origin, and are characterized chiefly by pain on pronation and supination of the foot and by stiffness of the affected joints. In the case of the tarsometatarsal affection the characteristic symptoms are rigidity and stiffness during plantar flexion, and simultaneous inversion of the anterior part of the foot, corresponding to slight pronation. There is tenderness over the joints and over the ball of the great toe. The prognosis in the condition is good, the treatment consisting in massage, passive movements, and the wearing of suitable insoles.—*Abst. Am. Med.*

182. Primary Actinomycosis of the Bones of the Tarsus. *Muen. med. Woch.*, Jan. 6, 1903.

O. Bollinger discusses the position of the actinomyces among the fungi, the manner of cultivating them, and the routes by which they enter the organism to infect it, also the pathology of the disease. He then relates the case of a man of sixty-four, who at the age of eleven injured the dorsum of the left foot with an iron instrument. After several weeks of suppuration the wound healed, and he had no further trouble with it until he was sixty-one, when pain and swelling appeared. Later he was unable to walk. A diagnosis of suppurative ostitis, possibly tuberculous, was made, and the foot amputated. An examination showed the bones riddled with actinomycotic sinuses and filled with fungi. It is possible that it was a recent cryptogenetic infection, but it is much more likely that the infection occurred fifty-three years before, being latent all these years.—*Abst. Am. Med.*

183. The Occurrence of the Os Trigonum in Man. By Nion. *Deutsch. milit. Zeit.*, 1903, p. 195.

In 291 skiagraphs of the foot, 13 (4.4) showed the presence of the os trigonum. This is of interest because of the possibility of mistaking it for a fracture.—*A. H. Freiberg, Cincinnati.*

184. Genesis and Treatment of Hollow Foot. By Heusner. *Von Langenbeck's Records*, vol. 69, Nos. 1 & 2.

A girl nineteen years old had an extreme double hollow foot. Within three months the foot was given an almost normal form. This was brought about by means of the author's ring-shaped lever. Subsequent treatment in connection with massage and gymnastics was carried out by means of a self-redressing apparatus. This consisted in broad straps of leather by means of which the back of the foot could be pressed against a sole of iron.

RHEUMATISM AND RHEUMATOID AFFECTIONS.

185. The Formation of Loose Cartilages in the Knee Joint. By E. A. Codman, M.D., Boston. *Boston M. & S. Jour.*, Oct. 15, 1903.

The author recites a series of observations and experiments to show that the so-called "rice bodies," or "joint mice," found in the knee joint are caused by the separation of small pieces of articular cartilage, usually from the internal condyle, which continue to live and acquire bony accretions after separation.

He was first attracted to this theory by noticing, in operations for removal of these bodies, a scar in the internal articular cartilage. Later he operated upon a case in which the loose body nearly fitted into a depression, or "bed," in the internal cartilage.

He exhibited a case from which he had removed four bodies, one of which was still adherent, like a "trap-door," to its bed in the condyle, while another fitted its bed exactly. Some showed considerable accretion of bony substance, and were considerably larger than those that did not. He shows skiagrams of the bodies removed with others from other sources, to show the new bony accretions; also, a skiagram of the joint before operation, in which three of the four bodies can be seen. He tried experimentally, on the cadaver, to detach such bodies from the internal condyle, but found that a blow caused a depressed fracture of part of the cartilage with a piece of cancellous bone, but did not detach it. He thinks this separation persists, and the fragment is detached later by a second injury after necrosis or callus formation has occurred.

He thinks the reason why the injury occurs more frequently to the internal condyle is because the external condyle is protected by the patella when the knee is flexed.—*John L. Porter, Chicago.*

186. Contribution on Osteoarthritis Deformans. Progress in the Field of Roentgen Rays. By A. Koehler.

X-rays are indispensable in studying osteoarthritis deformans, since by this method alone can we study the disease in its early stages. Before this discovery we had only an occasional chance to do this.

The author considers the most probable cause of the disease to be a congenital or acquired disease of the nervous system which inhibits more or less its trophical influence. He supports this view by many good pictures of the various phases of the disease. He considers that the intensity of the primary disease determines whether one or several joints are affected. It is impossible to enter into the particulars of this valuable article, since it is necessary to follow the illustrations.—*Abst. Archiv f. Orth.*, i. 2.

187. Rheumatic Arthritis and Other Allied Joint Affections. *Lancet*, Jan. 10, 1903, p. 102.

J. Dreschfeld, at the meeting of the Manchester Medical Society, said that most pathologists and clinicians were now agreed that rheumatic arthritis was an infectious disease, but the question whether it was due to a pathogenic micro-organism or whether more than one micro-organism might give rise to the same symptom-complex, or whether it was due to a non-specific micro-organism which only under certain hereditary or predisposing conditions became active, was still a disputed point. G. A. Wright spoke of the need for an entire revision of the nomenclature of joint diseases and the desirability of abolishing all names with rheumatism in them. J. Dixon Mann fully admitted the micro-organismal causation of acute rheumatism, but could not accept the view that streptococci which were capable of producing ordinary septicæmia were the micro-organisms in question.—*Abst. Am. Med.*

188. Articular Rheumatism and Some Allied Conditions. *Am. Jour. Med. Sciences*, March, 1903, p. 412.

Alfred Stengel presented records of six cases, illustrating various types of joint disease having a more or less superficial resemblance and requiring careful study to determine the pathology and diagnosis. Three of the cases were typical mild acute articular rheumatism, with varying conditions. One case was that of chronic rheumatism. Two cases known variously as rheumatoid arthritis, rheumatic gout, gouty rheumatism, deforming arthritis, arthritis deformans, osteoarthritis, Charcot's disease. The paper enters carefully into the pathology, and especially considers the clinical features, and is full of sound reasoning from the aspect of the general medical practitioner, and will be read with benefit by all who have occasion to see joints affected with the conditions described.—*Abst. Am. Med.*

189. Further Discussion of the Surgical Treatment of Arthritis Deformans, especially of the Smaller Joints. By Dr. J. Elter, Röstocker chirurg. Klinik. *Deutsch. Zeitschr. f. Chir.*, lxvi.

The first part is a review of the surgical treatment in arthritis deformans of the mon-articular type. Large joints have been resected with favorable results, but the smaller ones have only seldom been operated on.

In the next part the author reports five cases in which he himself operated on smaller joints for arthritis deformans.

Case I. Tempero-maxillary joint.—Resection of articulation, which showed characteristic changes; namely, absorption of cartilage, eburnation, and proliferated edges. After three years patient had had no pain, and had good functional result.

Case II. Metacarpo-carpal joint of thumb.—Opening the joint revealed a yellow exudate, a thickened capsule, fibrillation of the cartilage, and proliferated margins. The capsule was extirpated, the articular facets cleaned, and the proliferated edges chiselled off. Result, pain gone, motion good, except slight stiffness in morning.

Case III. Metatarso-phalangeal joint of great toe.—The chief trouble was great pain. The toe was dorso-flexed. Operation showed villous degeneration of the synovial and thickened joint edges, causing mechanical obstruction to motion. The edges were chiselled off and the capsule extirpated. Result good and ankylosis in straight position.

Case IV. Chopart's joint.—The operation was done for suppuration in a tendon sheath communicating with joint, but characteristic changes of arthritis deformans were found. The anterior astragaloid facet was resected and the tendon sheath laid open. Result good, with limitation of motion.

Case V. Astragalo-scaphoid joint.—Bad pain and difficult walking. The X-ray showed arthritis deformans. The scaphoid was excised. Result, improved.

Finally, the writer reviews palliative measures and other operative procedures. He concludes by saying spontaneous improvement has been observed, but questions whether such improvement is possible in cases where actual absorption of cartilage has already taken place, together with deformities and proliferated joint edges.—*Henry Feiss, Cleveland.*

190. The Pathology and Treatment of Rheumatoid Arthritis. By E. M. Merrins. *New York Med. Jour.*, Sept. 19, 1903.

E. M. Merrins says that the disease occurs in patients with an arthritic diathesis, or whose nervous system has been impaired by physical injury, shock, sorrow, or anxiety. Its history and the general clinical aspect of the disease point to some form of chronic poisoning as being most concerned in its production rather than to the direct action of a specific germ. This chronic poisoning depends on the elaboration in the system of certain toxins, which apparently may be the product of any general infection or local morbid condition. These toxins exert a peculiar and selective action upon the tissues

of the joints and nervous system concurrently, and so produce the characteristic nervous phenomena and arthritis of the disease. There is a small residue of cases closely resembling rheumatoid disease, if not identical with it, which seem to depend wholly and directly upon some functional or organic disorder of the nervous system, as so far they have not been or perhaps cannot be traced to any source of infection. The treatment must be conducted on the following lines: 1. Discovery and removal of the source of toxic infection; 2. Elimination of poisons from the system; 3. The repair of ravages of disease; 4. The relief of pain.—*Abst. Am. Med.*

191. The Diagnosis of Acute Tuberculous Rheumatism.

The diagnosis of acute tuberculous rheumatism is often difficult, and one is frequently placed in a position of making a diagnostic error. In children this is more likely to happen on account of the difficulty experienced in obtaining correct answers to questions. An osteomyelitis, especially when localized near the epiphyses and showing itself in several points at the same time, may give rise to many mistakes; but under these circumstances one should take into consideration the intensity of the general symptoms, the rise in temperature, the marked typhoid condition, and rely above all on the findings given by a minute examination of the skeleton. It is, however, with acute articular rheumatism that the acute tuberculous form is more frequently confounded, because in the latter affection its polyarticular manifestations simulate the ordinary acute type, while clinically they closely imitate each other. The tuberculous form, however, differs by the rapidity with which it becomes localized in a joint, by the absence of any effect from the administration of sodium salicylate or the coal-tar products, and above all by its tendency to give rise to plastic products, often resulting in ankylosis. A point to be noted in the differential diagnosis is the character of the pain. In the infectious pseudo-rheumatism, due to Koch's bacillus, as in all forms of arthritis for that matter, the greatest pain will be found by exerting pressure over the joint itself; while in acute articular rheumatism the periarticular parts, tendon sheaths, periarticular serous bursas, articular ligaments and tendons, will give rise to the pain. It has been pointed out by Lasègue that in acute articular rheumatism there is no intra-articular pain, but the fibrous tissue and bursas and serous coverings of the tendons are more involved than the synovial membrane of the joints. He gave as a proof of this the possibility of giving passive motion to joints so afflicted without provoking suffering to the patient, if the latter could be made to relax the muscles going to the joint thus immobilized. A differentiation with true acute articular rheumatism having been made, it is necessary, in order to complete the diagnosis, to look for the cause of the trouble,—a task often long and difficult. If, however, the patient has never been the victim of gonorrhœa or former puerperal infection, nor of any infectious process susceptible of producing joint manifestations, one should always think of tuberculosis. Should the patient give an hereditary or personal history of tuberculosis or should he show lesions of a tuberculous nature, it is both logical and prudent to connect the joint affection with Koch's bacillus. Cytodiagnosis, peritoneal inoculation in the guinea pig of the fluid obtained from the joints and cultures made from it, will result in settling a faltering diagnosis.—*Am. Med.*

192. Arthritis Deformans: The Report of a Series of 110 Cases from the Johns Hopkins Hospital. By Thomas McCrae, M.D., M.R.C.P. London. *Jour. Am. Med. Ass'n*, vol. xlii., January 2, 9, and 16, Nos. 1, 2, and 3.

McCrae describes the chaotic condition of terms, emphasizes the relative frequency of the disease, and urges the necessity of early diagnosis. He recognizes two types, the so-called osteoarthritic and the rheumatoid, and considers the question of there being different diseases as open.

The general statistics of these 110 cases show the sexes about equally

divided. Ninety-six were native-born, and the vast majority were engaged in indoor occupations; while a very small proportion were exposed to unfavorable weather conditions.

He divides the cases for clinical study into four classes:—

1. Heberden's nodes.
2. Polyarticular form (excluding spondylitis).
3. Monarticular.
4. Spondylitis.

1. Heberden's nodes. He calls attention to the facts that (1) the accurate knowledge of the condition is slight; (2) they are rarely associated with serious disease in other joints; (3) they are of the osteoarthritic type, and yet sometimes seen with lesions in other joints of the rheumatoid type.

2. Polyarticular forms. These comprise by far the greater number (92) of cases. He includes here the two cases of so-called "Still's" disease, which occurs in young subjects, is polyarticular, showing mainly periarticular changes and little bone involvement. In these periarticular cases the onset was gradual in 45, sudden in 31. The majority were polyarticular from the start. The attacks were of two main characters,—slow progressive in 44, repeated acute in 29. Twelve showed characteristics of both. Illustrative cases of both are given. He then considers the symptoms in detail, taking up the special joints, of which the most frequently involved are the knees and shoulders.

In the differential diagnosis from acute rheumatism he considers the polyarthritis, the slight rise in temperature, the rather rapid pulse, the atrophy, the slow progression, and the negative action of salicylates as striking features. The urine was usually normal, glandular enlargement common, splenic enlargement rare, subcutaneous fibrous nodules in 7 out of 110. The blood shows a red count, and hæmoglobin higher than the frequent pallor suggests.

The *pathology* of the condition is said to be still uncertain. The view of an infective origin with a secondary toxæmia explaining some of the nervous symptoms is favored.

The *treatment.* In the acute attacks palliative; after the acute attack general tonic, with much out-of-door life and much attention to nutrition. Medicinal baths are often harmful.

McCrae urges massage of the joints in the early stages, and speaks favorably of hot air in administration of 20–30 minutes at 350° F. Use of the joints after the acute attack is encouraged. Of the drugs he commends the use of iodide of iron and arsenic.

In the line of *surgical treatment*, tenotomies and forcible straightening under an anæsthetic are advised in the presence of obstinate contractures, while excisions are considered justifiable in certain cases.

The prognosis should be guarded, and is usually rather gloomy.

3. Monarticular form. The author considers that more of the cases of chronic articular rheumatism should be classed here, and also the type morbus coxæ senilis.

The treatment he considers palliative only.

4. Spondylitis. This group McCrae considers chiefly of the osteoarthritic type. It is much more common among males. The frequent onset in early adult life is also striking. The temperature is usually slightly raised, the blood is negative.

Pathologically, he recognizes the new bony deposit occurring frequently along the anterior aspects of the vertebral bodies and often involving the intervertebral disks. Lateral curvature results, if the disease is more on one side than the other. The common leg pain is due to nerve root pressure from the new bony deposit.

The diagnosis is not difficult with a knowledge of the condition. The credit of drawing attention to these conditions he attributes to Dr. J. E. Goldthwait, of Boston. He recognizes the fact that many cases of so-called sciatica are due to this condition.

The mainstay of the treatment is complete rest, accompanied by a stiff

jacket; plaster at first applied with patient standing in as correct position as possible without the use of force; later a leather jacket, when the deviations have been corrected, perhaps followed by a lighter support until the process is at a standstill. He gives the following conclusions:—

1. "The frequency of the occurrence of acute polyarthritis in arthritis deformans and the danger of mistaking this for acute rheumatism."

2. "The importance of recognition of the spinal forms of the disease, especially the local involvement."

3. "That in arthritis deformans we have an obscure disease of considerable frequency worthy of study, especially from the etiological aspect."—*R. B. Osgood, Boston.*

PARALYSIS.

193. **The Correction of Deformities following Anterior Poliomyelitis by Subperiosteal Implantation of Tendons of Unaffected Muscles.** By James T. Watkins, San Francisco. *California State Jour. of Med.*, September, 1903.

After briefly reviewing the pathology of infantile paralysis, Watkins says that where secondary deformities are present the orthopedic problem is two-fold: first, the correction of the deformity; second, the restitution of function. He discusses the earlier methods of treatment; the application of portable apparatus with no attempt to correct the deformity; the forcible "remodelling" method, combined with division of such structures as could not be stretched, and followed by functional use of the limb, which was held in position by plaster of Paris and subsequently by sheath-splints. Arthrodesis is advocated in selected cases. He describes at length the technique of the tendon-to-tendon suture as first employed by Nicoladoni and afterwards advocated by Vulpius and others, and recommends buttonholing one tendon into the other, and the cross coaptation suture employed by Vulpius.

The method is subjected to a critical analysis The reports of good results, with which the later orthopedic literature teems, are discounted, because of the indefinite language in which these reports are framed. "Whether 'a good result,' 'a satisfactory result,' signifies that there is no return of the deformity, or that there is a complete or almost complete restitution of function, the reports do not show." He believes that, if cases other than those due to poliomyelitis were excluded from the reports, and if a longer period of time were permitted to elapse between the operation and the reports of the operation, a very much smaller percentage of good results would be recorded. Causes of failure are classed as functional, technical, and pathological. In the first group, failure may be due to employing too weak a muscle to do the work of a strong one, or perhaps to grafting a paralyzed muscle to one of a widely different or antagonistic function. Technical defects are errors in sewing, failure to obtain a sufficient tension, and so attaching the tendons that the pull of the active muscle is not exerted in the direction of its muscular contraction. The pathological cause of failure is seen in the fact that through destruction of the trophic centres in the cord an atrophy has resulted which is out of proportion to the atrophy following disuse alone. Consequently, except in selected cases, the tendon of the paralyzed muscle stretches between its insertion and its attachment to the healthy tendon. For these reasons the result must in most cases be transitory, and necessitate the wearing of apparatus.

Watkins advocates the method of periosteal or subperiosteal implantation as performed by Lange. It consists in freeing the whole or part of a healthy tendon from its insertion, and attaching it to that bony point where it will obtain the best leverage in combating the tendency to deformity and to restoring function. The advantages of this method are the employment of healthy tendon and the freedom permitted in choosing the site for the attachment of the new muscle. The completeness of the result will depend

upon the tension under which the new muscle shall begin to contract. The technique of the operation is minutely described and illustrated by seven diagrams.

When a result has held its own during nine months of functional use, it may be safely classed as permanent.

A report is appended of an independent examination made by Watkins upon six of Lange's cases eighteen months to two years after they had been operated upon.

194. A Method of Treating by Operation Paralysis of the Upper Root of the Brachial Plexus. By A. H. Tubby. *British Med. Jour.*, Oct. 17, 1903.

The chief muscles affected in this type of paralysis (the Erb-Duchenne type) are the deltoid, infra-spinatus, biceps, brachialis anticus, and supinator longus. The patient is unable to flex the elbow and cannot abduct the shoulder. So far as Mr. Tubby's knowledge goes, no one has attempted nerve grafting to replace the damaged root; and he thinks that the complexity of the problem is so great that it is doubtful if we are to get any relief from this procedure. In his opinion it is best, therefore, to utilize what is left of the remaining healthy muscles of the upper extremity. The restoration of power of flexion to the elbow is the easier, and that of abduction of the shoulder the more difficult, of the two problems. Mr. Tubby uses the triceps muscle in the following way: An incision 4 to 6 inches long is made from the middle of the back of the upper arm downwards and forwards to the front of the elbow and following the course of the musculo-spiral groove. The musculo-spiral nerve is drawn one side. The outer part of the triceps is detached low down near the olecranon until a strip 4 inches long is obtained. This is inserted into the biceps through a slit made 2 inches above its insertion, and firmly pleated in place while the elbow is held in the flexed position. In two cases where the writer did this operation, voluntary motion returned in from four to six weeks. He thinks it better to treat the elbow first, and later operate for the relief of the paralyzed deltoid. The steps of the operation which Mr. Tubby has performed (muscle grafting) are as follows: The incision commences 1 inch below the middle of the clavicle, passes outward to the tip of the acromion, and then downward for 3 inches. A second incision is made from the tip of the acromion upwards for 3 inches or so along the margin of the trapezius. Flaps are reflected, and the portion of the pectoralis major arising from the clavicle is followed to its insertion into the humerus and detached. The insertion of the trapezius is then separated from the clavicle. The clavicular portion of the pectoralis major, now almost a separated muscle, is brought upward so as to lie over the acromion process and tail downward toward the insertion of the deltoid. The portion of the trapezius detached from the clavicle is now inserted into the upper part of the pectoralis, so that a new conjoined muscle is formed of trapezius and pectoralis. If the tongue of muscle is long enough, it is well to turn up a large piece of periosteum near the deltoid insertion, and attach it here; but otherwise it is inserted directly into the deltoid near its insertion. In the first case which Mr. Tubby operated upon he used the pectoralis major only, the result being that considerable power of abduction of the shoulder was regained. In the second case the trapezius was used also, and the result here promises to be much better. The writer makes the point, also, that after muscle grafting operations the grafted muscle must never be put on the stretch for at least a month, and should be very gradually allowed to attempt to perform its full function.—*Harold W. Jones, St. Louis.*

195. Modern Methods in the Surgery of Paralyses, with Special Reference to Muscle Grafting, Tendon Transplantation, and Arthrodesis. By A. H. Tubby, M.S. Lond., F.R.C.S. Eng., and Robert Jones, F.R.C.S.E.

In the "Surgery of Paralyses," by Mr. A. H. Tubby and Mr. Robert Jones, we have descriptions of the most successful methods employed in this most

modern domain of surgery. The authors speak from large personal experience, and are broadly conversant with the best German and American work. Many of the measures advocated are original, and all are illustrated by carefully recorded cases which have been satisfactorily treated by these methods.

In the three sections of the work are considered:—

1. Infantile paralysis, or acute anterior poliomyelitis.
2. Infantile spastic paralysis, or cerebral paralysis of children.
3. Paralysis and deformities arising from injuries and diseases of nerves and some degenerations of the spinal cord.

The first section deals with infantile paralysis etiologically, pathologically, and in detail of lesion. The reader is struck with the simplicity and economy of much of the apparatus advised, while both in the mechanical and surgical treatment a most strong element of "common sense" predominates. For instance, the importance of placing the weakened muscles under mechanically favorable conditions is emphasized as the "dominant note in the long list of paralytic deformities." The methods of muscle grafting and tendon transplantation are given in great detail, with descriptions and illustrations of indications and operations.

The second section is most interesting to any one who has seen the really remarkable results of Mr. Jones's cases of spastic paraplegia treated by courageous surgical measures. The fact that many of these unfortunates now walk comfortably without distressing spasticity and with their mental horizons much broadened is due to him.

The last section comprises many of the rarer forms of paralysis, from the various toxæmias and traumata. Many of these conditions the authors frankly state are not amenable to surgical treatment.

The book supplies a distinct want in English orthopedic literature, and indicates original and successful surgical methods of treatment in many cases which have long been considered as belonging exclusively to the instrument makers or the neurologists.—*R. B. Osgood, Boston.*

TENDONS AND MUSCLES.

196. The Results of Extirpation in Hygroma of Tendon Sheaths of the Hand. By Zöppritz. *Beitr. z. klin. Chir.*, Bd. XXIX. Heft 3.

With the acceptance of the tuberculous nature of these cases, extirpation has become the rational method of treatment in place of simple incision or curettage of the sheath. The justification of this treatment lies in the paucity of recurrences after it. Thirty-five cases so treated are reported. Thirty-one have been followed up. Of 33 hands thus operated upon, 25 have remained perfectly well. In more than half of the cases the function of the hand was perfectly restored. Since the cases were for the most part well advanced before operation, the author considers the results very satisfactory. *A. H. Freiberg, Cincinnati.*

197. A Case of Progressive Ossificating Myositis. By E. Soncini. *Arch. di Ortop.*, 1903, xx. 2.

A girl of four years and eleven months was admitted July 25, 1902. A sister had died of meningitis. Two months before admission a tumefaction was noticed under the chin, then in various places on the neck and armpits. When admitted, the movements of the head were very limited. The treatment was mercurial and iodo-ferruginous frictions with some improvement, but some of the symptoms persisted. Five months after, the head and neck remained in rigid flexion. Taken home by parents Jan. 20, 1903. Seemed near death. The local conditions had not changed. The above-mentioned treatment, supplemented by warm baths, seemed to have no appreciable effect.